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TWENTY-NINTH ANNUAL REPORT

OF THE

SECRETARY

OF THE

STATE BOARD OF HEALTH

OF THE

STATE OF MICHIGAN

FOR THE

FISCAL YEAR ENDING JUNE 30, 1901.

BY AUTHORITY

1902.
WYNKOOP HALLENBECK CRAWFORD CO. OF LANSING, MICH.
STATE PRINTERS.

Public Health
Gift
Henry F. Vaughan
3-16-44

OFFICE OF THE
SECRETARY OF THE STATE BOARD OF HEALTH,
LANSING, MICHIGAN, *December, 1901.*

TO HON. A. T. BLISS, *Governor of Michigan:*

SIR—In compliance with the laws of this State, I present to you the accompanying report for the fiscal year ending June 30, 1901.

Very respectfully,

HENRY B. BAKER,

Secretary of the State Board of Health.

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REPORT.

PART I.

INTRODUCTION AND GENERAL STATEMENTS.

This is the Twenty-ninth Annual Report of the Secretary of the State Board of Health, and is for the fiscal year ending June 30, 1901. It is arranged in two parts.

The first part contains the secretary's report of work of the Board during the fiscal year; regular and special meetings; biennial report; public health legislation and proposed legislation; president's annual address; general work in the office of the secretary; report of the secretary relative to property; financial statement; abstracts from the quarterly reports of work in the office of the secretary, and of the condition of health during the six months ending June 30, 1901. (The subject of the sickness in the calendar year preceding, is included in the article in the second part of this annual report, therefore the article on the first six months of 1901 brings the subject completely up to date.)

The second part contains abstracts and reports, including a report on "Principal meteorological conditions in Michigan in 1900," one on "Time of greatest prevalence of each disease," being a "Study of the causes of sickness in Michigan," especially in 1900, one on "Communicable diseases in Michigan in 1900," and others on consumption, pneumonia, diphtheria, typhoid fever, scarlet fever, measles, whooping-cough, meningitis, smallpox, and other communicable diseases, including ecthyma, chicken-pox, cowpox, anthrax, alleged rabies, nuisances, glanders, and tuberculosis in animals in Michigan in 1900. The second part also contains articles pertaining to loss of life and property alleged to have been caused through the use of kerosene and gasoline and on alleged nuisances.

Reports, etc., required by law.—Much of the work of the State Board of Health, and of its secretary and executive officer, is in the collection, preparation, and spreading of information useful for the restriction and prevention of diseases, and the methods of work are dealt with further on in this report; but, under the law the secretary of the Board is specifically required to disseminate information "through an annual report, and otherwise;" pursuant to which, by direction of the Board, he issues immediately after the close of each week, a bulletin, which shows the diseases which caused most sickness during the week just passed; also a monthly bulletin, showing the relative importance of diseases during the month, and sometimes a quarterly bulletin is published containing the proceedings of the Board, the report of work in the office of the secretary, and the condition of health during the quarter. The proceedings of sanitary conventions have usually been published as soon as practicable after the occurrence of each convention.

Since April, 1898, a monthly publication, entitled "Teachers' Sanitary Bulletin" has been issued by the Board to supply to the many thousands of teachers in the public schools in Michigan suggestions to enable them better and more completely to comply with the law which requires "That there shall be taught in every year in every public school in Michigan the principal modes by which each of the dangerous communicable diseases is spread and the best methods for the restriction and prevention of each such disease."

Sanitary information published ephemerally.—The secretary also disseminates information by means of the telegraph, the telephone, by letter, and especially by means of hectographed and neostyled statements prepared and distributed to members of the Board, to others interested in public health work, and to newspapers in Michigan. Thus items of sanitary interest which are considered as useful "news" are published at once in comparatively ephemeral bulletins, etc., while the annual report is issued as a permanent official record of the work of the State Board of Health, of the office of the secretary, and of local boards of health throughout the State.

Names and addresses of members of the Board.—The names and post-office addresses of members of the State Board of Health, and the dates of the expiration of their terms of office, are as follows:

Hon. Frank Wells, *President of the Board,* Lansing, January 31, 1903.
Fred R. Belknap, M. D., Niles, January 31, 1903.
Collins H. Johnston, M. D., Grand Rapids, January 31, 1905.
D. A. MacLachlan, M. D., Detroit, January 31, 1905.
Hon. Henry A. Haigh, Detroit, January 31, 1907.
Victor C. Vaughan, M. D., Ann Arbor, January 31, 1907.
Henry B. Baker, M. D., *Secretary of the Board,* Lansing.

The members of the State Board of Health, with the exception of the secretary, are appointed for the term of six years, and receive no salary or per diem compensation for their services.

Standing committees of the State Board of Health.—Notwithstanding the assignment to committees of the duty of investigation in certain lines of work, each member is free to present any facts or views on any subject relative to or having any bearing upon the public health.

The committees as rearranged and adopted by the Board April 12, 1901, and the members appointed on committees by President Frank Wells, April 12, 1901, are as follows:

1. Epidemic, endemic and communicable diseases, Victor C. Vaughan, M. D.
2. Sewerage and the disposal of excreta, Fred R. Belknap, M. D.
3. Water supply, including purification of sewage-contaminated water, Collins H. Johnston, M. D.
4. Buildings, including house drainage, ventilation, heating, etc., D. A. MacLachlan, M. D.
5. Climate, geology, topography and drainage, Henry B. Baker, M. D.
6. Foods, drinks and their adulteration, Victor C. Vaughan, M. D.
7. Poisons, explosives, etc., Fred R. Belknap, M. D.
8. School hygiene and sanitation, D. A. MacLachlan, M. D.

9. Sanitary inspections in cities and villages, Henry B. Baker, M. D.
10. Statistics of mortality and sickness, Hon. Frank Wells.
11. Public health legislation, Hon. Henry A. Haigh.
12. Finances of the Board, Hon. Frank Wells.
13. Animals' diseases dangerous to man, Collins H. Johnston, M. D.
14. Relations of preventable sickness to taxation, Henry B. Baker, M. D.
15. Quarantine at the Michigan border and within the State, Hon. Henry A. Haigh.

WORK OF THE STATE BOARD OF HEALTH DURING THE FISCAL YEAR ENDING JUNE 30, 1901.

Aside from the work in committees and in connection with the office of the Secretary of the Board, the work of the State Board of Health itself has included that done at the sanitary convention, that in connection with the examination of plans and specifications for proposed public buildings, and the work done at regular and special meetings of the Board.

Sanitary conventions.—An important sanitary convention was held at Durand, September 6 and 7, 1900, participated in by persons interested in public health subjects, several health officials and physicians being present from other parts of the State. At this convention as at others of the kind, held from time to time under the direction of the State Board of Health, the subject of greatest moment to the particular locality was the central theme, and the heaviest stress laid upon it in the papers and discussions, although the general educational work of the board, the modern principles of public sanitation and the best ideas in public health work are brought out. Such conventions are usually attended by those persons in the locality or neighborhood most interested in sanitary conditions, improved public health and the welfare of the locality. They are frequently largely attended by neighboring health officers and others interested in public health work. The proceedings of this convention were not published because of lack of appropriation.

Examination of plans for State buildings,—sewerage, ventilation and heating,—during the fiscal year ending June 30, 1901.—The following is a list of the buildings for which plans and specifications were examined, under Act No. 206, Laws of 1881 (Sec. 2229, Compiled Laws of 1897; Sec. 15, Public Health Laws 1899), during the fiscal year 1901:

Lansing, June 12, 1901.—Proposed new one story addition to the dining-room and kitchen, at the Michigan School for Deaf, Flint. Suggested addition to fresh air supply and that sink drain be trapped.

Lansing, June 12, 1901.—Proposed new hospital at the Michigan School for the Blind, Lansing. Plans generally approved and commended.

Lansing, June 12, 1901.—Proposed farm house and proposed cow shed, for the Michigan Home for Feeble Minded and Epileptic, Lapeer. Plans generally approved.

Lansing, June 12, 1901.—Proposed alterations in the east wing of the administration building at the State Industrial School, Lansing. Change in ventilation facilities suggested.

Lansing, June 12, 1901.—Proposed new double cottage for the Industrial School for Boys, Lansing. Generally approved and commended.

Lansing, June 12, 1901.—Proposed cottage building for the State Industrial Home for Girls, Adrian. Suggested changes in heating, ventilation and sewerage.

Lansing, June 12, 1901.—Proposed addition to the State Normal School, Mt. Pleasant. Suggested changes in heating, ventilation and sewerage.

Lansing, June 12, 1901.—Two proposed cottages for the Northern Michigan Asylum, Traverse City, both to be erected according to the same plans. Suggestions as to ventilation and heating.

REGULAR AND SPECIAL MEETINGS OF THE STATE BOARD OF HEALTH, DURING THE FISCAL YEAR ENDING JUNE 30, 1901.

The minutes of the regular and special meetings of the Board up to and including the meeting October 23, 1888, were copied into the permanent record books in the office of the secretary. From that time and including the proceedings of the meeting May 13, 1898, the minutes have been printed in the annual reports of the Board. The annual report for 1898 is the last one in which the proceedings of the meetings of the Board are printed in full. Commencing with the annual report for 1899 the law of 1899 took effect, and the volume was greatly reduced in size, being limited to 300 pages. Accordingly mention only may be made of the times and places of meetings and members present at each of the regular and special meetings during the fiscal year.

Adjourned regular meeting, July 20, 1900.—The members present were: Prof. Delos Fall, Dr. Fred R. Belknap, Dr. Collins H. Johnston, and Dr. Henry B. Baker, Secretary.

Special meeting, September 6 and 7, 1900, in Durand.—The members present were: Hon. Frank Wells, President; Prof. Delos Fall, and Dr. Henry B. Baker, Secretary.

Regular meeting, October 12, 1900.—The members present were: Hon Frank Wells, President; Dr. Fred R. Belknap, Dr. Collins H. Johnston, Hon. Aaron V. McAlvay, Dr. D. A. MacLachlan, and Dr. Henry B. Baker, Secretary.

Adjourned regular meeting, November 16, 1900.—The members present were: Hon. Frank Wells, President; Dr. Fred R. Belknap, Dr. Collins H. Johnston, Dr. D. A. MacLachlan, Prof. Delos Fall, Hon. Aaron V. McAlvay, and Dr. Henry B. Baker, Secretary.

Adjourned regular meeting, December 14, 1901.—The meeting to be held on this date according to adjournment was not held, only the Secretary being present.

Regular meeting, January 11, 1901.—The members present were: Hon. Frank Wells, President; Dr. Fred R. Belknap, Hon. Aaron V. McAlvay, Dr. D. A. MacLachlan, Dr. Victor C. Vaughan, and Dr. Henry B. Baker, Secretary.

Regular meeting, April 12, 1901.—The members present were: Hon. Frank Wells, President; Dr. Fred R. Belknap, Dr. D. A. MacLachlan, Dr. V. C. Vaughan, Hon. Henry A. Haigh, and Dr. Henry B. Baker, Secretary.

Special meeting, June 12, 1901.—The members present were: Hon. Frank Wells, President; Hon. Henry A. Haigh, and Dr. Henry B. Baker, Secretary.

BIENNIAL REPORT OF THE STATE BOARD OF HEALTH, JANUARY, 1901.

To the Governor and Legislature of Michigan:

GENTLEMEN—For the best interests of the people of Michigan, legislation on several sanitary subjects is needed.

Public-health work consists mainly in measures for the restriction of dangerous communicable diseases. Such diseases cannot be restricted by health officers and boards of health acting alone; for success in this work, the co-operation of the medical profession and of the people generally with the health officials is essential. This can best be secured by distributing, to the neighbors of premises placarded for a dangerous disease, pamphlets and leaflets telling just how to restrict that particular disease. Such instructions should be reliable, and be sanctioned by the highest authority on that subject in the State; then they reinforce the action taken by the *local* health officials. The Michigan State Board of Health investigates the causes of diseases, and supplies local health officers with copies of such printed instructions. They are sent to the health officer on receipt from him of notice of an outbreak.

The apparent results of this method of work are now known to be extremely important. Since its inauguration in Michigan, the mortality from scarlet fever has been reduced, by some cause or causes, so that it is now less than half what it was before; from smallpox, it is less than one-fourth what it was before; a very considerable diminution has occurred in the mortality from typhoid fever, and from diphtheria; the diminution in the deaths from consumption (the most important disease) has taken place somewhat later than that from some other diseases, yet it has been of such a degree as to warrant the Board in vigorously prosecuting its present plan of work.

The work of the State Board of Health has greatly increased.—When the State Board of Health commenced this work, very little was accomplished during the first few years; but the usefulness of the work has gradually increased until now a large proportion of all the health officials in Michigan seek to co-operate; and, whenever a dangerous communicable disease occurs in a locality, the health officials usually promptly notify the Secretary of the State Board of Health, and ask for copies of leaflets on that particular disease, for distribution to the neighbors of infected premises. This very greatly increases the effectiveness of the work of the State Board of Health, but it also increases its expenses, for supplying the literature necessary to secure the co-operation of the people with the local health officials. The work which is accomplished by the State Board of Health has outgrown the very small appropriations made for its use. The city of Detroit contains about one-tenth of the entire population of the State; if that city were to enter upon this method of public-health work, as it is earnestly hoped that it will, the demand upon the State Board of Health would be greatly and suddenly increased. The State Board of Health has never had what may properly be termed an appropriation for the general purposes for which the board exists. For the highest welfare of the State, such an appropriation should be made. It need not be large, perhaps five thousand dollars per year.

Appropriations for public-health purposes yield large returns.—For many of the appropriations made by the State, no return of money values is to be expected; but for the appropriations made for the State Board of Health there may be expected large returns. Past experience warrants this. The lessened death rates from scarlet fever, diphtheria, smallpox, typhoid fever, and consumption, represent a saving of money values to the people of Michigan of more than a million of dollars per year. There still occur in Michigan, however, deaths from preventable causes; and plague and other communicable diseases may at any time be brought into this State; therefore it seems judicious to increase or at least maintain the efficiency of the public-health work, and for that purpose the small appropriation previously mentioned is needed.

Who shall decide what diseases shall be restricted?—From time to time the progress of sanitary knowledge develops the fact that some disease not previously known to be spread from person to person, is really communicable, and, therefore, might be prevented if promptly reported to the local health officer. Thus far, in every such instance, as has been the case with scarlet fever, diphtheria, typhoid fever, and consumption, persistent opposition has been met with, such as refusals by householders and physicians to report cases of such disease, and refusals by boards of supervisors to allow expenses incurred in the restriction of such diseases. Expensive litigation results, and still greater expenses occur because of the spread of diseases which might be restricted. These losses continue many years,—it is now twenty years since members of the State Board of Health began teaching that consumption is a dangerous communicable disease; and yet a case is even now in the courts, this important question in sanitary science remaining, under the present law, to be decided by an ordinary jury, composed of men having no special scientific training in the technical knowledge necessary for the decision of such a question. It is believed that thousands of dollars in expenses, and thousands of lives might be saved to the people of Michigan by the enactment of a brief law which would place the decision, from time to time, of what diseases are "dangerous to the public health" in the State Board of Health, or some other proper State authority consisting of experts in Sanitary Science, which authorized body shall be charged with the duty of publishing in each year to the boards of supervisors, and to the householders and physicians, just which diseases are then known to sanitarians to be "dangerous to the public health" and therefore are required by law to be reported and restricted.

State hospital for consumptives.—The State Board of Health reiterates its plea, made in past years and to preceding legislatures, for one or more State hospitals for consumptives. At least one such hospital is much more needed by the people of Michigan than is any other existing or prospective hospital, asylum, or educational institution. Abundant reasons why such legislation is in the interest of public economy, as well as in the interests of the public health, are fully set forth in preceding biennial reports, annual reports, and other publications issued by the State Board of Health during the past seven years. In legislation on this subject, Michigan has not kept pace with other progressive States and countries.

Milk from tuberculous cows should not be sold.—This Board again asks for a law which shall forbid the sale of milk in cities and villages by unlicensed persons, and from any cow not proved by the tuberculin test under the direction of a competent veterinarian, to be free from tuberculosis.

Annual public meeting.—One of the most important measures for the promotion of the public health would be the holding of a public meeting of the qualified voters in every locality, at which meeting the local board of health should be required to submit a report of its work during the past year, and its plans and estimates for the ensuing year. The proposals for expenditures for public-health purposes should then be considered, and the amount to be raised for those purposes should be voted upon by the qualified voters, in a manner similar to the procedures at school meetings, under the school laws. In townships this might be done at the annual township meeting, and in cities and villages at some proper meeting or at some meeting of the qualified voters held for that special purpose, as is now the case relative to meetings for school purposes.

The State Board of Health earnestly memorializes the legislature for the enactment of a law providing for such annual public-health meetings in townships, cities, and villages. Of the many reasons why this is for the public good, two are as follows:

Under present laws there is not such co-operation of the people generally with the health officials as would lead to the best results. An annual public meeting would supply opportunity for conference and mutual explanations.

In some places the health officers have not been supported by the people in restricting some of the dangerous communicable diseases, and bills necessarily incurred in restricting those diseases have not been allowed by the local board, or, if audited by that board, have been rejected by the board of supervisors, so now the health officers in those places make no effort to restrict either measles, or whooping-cough; and in some counties bills for the restriction of typhoid fever have been rejected, therefore some health officers make no effort to restrict that disease; and, not only great expenses follow, but also sickness and deaths, which might have been prevented. Such non-action leads to many complaints by citizens to the office of the State Board of Health; but the trouble is local, and in great part could be done away with by a law which would require an annual public meeting at which the will of the people could be expressed in tones which would be heeded by the health officers.

PUBLIC HEALTH LEGISLATION AND PROPOSED LEGISLATION.

Laws enacted in 1901 relating to the public health.—Act No. 140, adding two thousand dollars per year to the funds of the Board available for general purposes, reads as follows:

Act No. 140, 1901.

An act making an appropriation for the use of the State Board of Health for general purposes for the promotion of the public health for the fiscal year ending June thirty, nineteen hundred two, and each fiscal year thereafter, and to provide for a tax to meet the same.

The People of the State of Michigan enact:

SECTION 1. That the sum of two thousand dollars is hereby appropriated for the fiscal year ending June thirty, nineteen hundred two, and each fiscal year thereafter, to meet the expenses incurred by the State Board of Health for the promotion of the public health, including expenses for the publication of leaflets and pamphlets for distribution to the neighbors of premises infected with dangerous communicable diseases. All bills to be paid from this fund shall be approved by the State Board of Health, after which, on certificate of its officers, the Auditor General shall draw his warrants upon the State treasury for the certified amounts so far as they shall appear to the Auditor General to be for lawful purposes, but at no time shall the amount paid under this act be in excess of the annual appropriation therefor: *Provided,* That the State Board of Health may obtain money under this section before July first, nineteen hundred one, in such amounts as they represent to the Auditor General are necessary for immediate use, which amounts thus advanced shall be deducted from the total amount appropriated for the fiscal year ending June thirty, nineteen hundred two, when the appropriation becomes available.

SEC. 2. The Auditor General shall incorporate in the State tax for the year nineteen hundred one and each year thereafter the sum of two thousand dollars, which, when collected, shall be credited to the general fund to reimburse the same for the money hereby appropriated.

An important measure from the public health view point, was that advocated by and enacted largely through the efforts of the Michigan Funeral Directors' and Embalmers' Association, and which was enacted as

Act No. 233, 1901.

An act to authorize the State Board of Health to determine the qualifications of, and issue licenses to persons engaged in preparing for transportation human bodies dead of infectious or contagious diseases.

The People of the State of Michigan enact:

SECTION 1. The State Board of Health is hereby empowered to issue licenses to persons qualified to properly embalm and disinfect bodies dead of infectious and contagious diseases, such qualifications to be determined by an examination by the State Board of Health.

SEC. 2. These examinations shall be held at Lansing, at least once each year, and at such other times and places as shall be designated by the State Board of Health, for the convenience of candidates for licenses under this act: *Provided,* That the meeting held to examine candidates for license, residing in the Upper Peninsula, shall be held in the Upper Peninsula.

SEC. 3. Applications for licenses shall be accompanied by a fee of five dollars, which shall entitle the applicant to an examination, and to a license if he passes a satisfactory examination. The fees collected by the Board of Health shall be used to defray the expenses incurred by said board in the enforcement of this act, and for no other purposes. Any surplus which may be created under this act shall be covered into the treasury of the State of Michigan at the end of each year for the benefit of the general fund of the State.

SEC. 4. The licenses shall be signed by the president and secretary of the State Board of Health, with the seal of the board attached.

SEC. 5. The State Board of Health is hereby empowered to revoke any license which may have been issued, upon sufficient evidence that the rules and regulations of the board governing the preparation of dead bodies for transportation have been violated.

SEC. 6. The secretary of the Board of Health shall keep a record, in which shall be registered the names and residences of all persons to whom licenses have been granted in accordance with this act, and the number and date of each license. A copy of this record shall be furnished to all those holding licenses, and also to the various transportation companies within the State. The secretary of the Board of Health shall also keep a record of all fees received and expenses paid under this act, and make a report thereof annually to the Governor.

Proposed public-health legislation.—The following bills introduced before the legislature at the session of 1901, relative to the public-health, and looking to improvement along the line of public sanitation were not passed.

House bill No. 227, introduced by Mr. Goodrich, entitled "A bill to define the terms 'sickness dangerous to the public health' and 'disease dangerous to the public health,' employed in sections forty-four hundred twenty-four, forty-four hundred fifty-two, forty-four hundred fifty-three and forty-four hundred fifty-four of the Compiled Laws of 1897, section one of act one hundred thirty-seven of the Public Acts of eighteen hundred eighty-three, and elsewhere in the laws of Michigan, and to provide for the publication of a list of said diseases," was introduced with a view to having the dangerous communicable diseases officially declared, from time to time, so that there would be no question either in the minds of the householders or of the health authorities as to which are the dangerous communicable diseases, that the laws relative to the restriction and prevention of such diseases might be promptly enforced in all instances, and not be prevented on some technicality.

House bill No. 253, introduced by Mr. Goodrich, entitled "A bill to provide for the testing of all milch cows, the milk from which is sold for use in incorporated cities and villages, and for stopping and preventing the sale of milk from animals proved to be tuberculous," was introduced for the purpose that in the future the people in cities and villages might be protected from the sale and use of milk from cows infected with tuberculosis. It required, in substance, that milk sellers be required to carry on their trade under a license from the local board of health, to be granted them after a tuberculin test of the cows, by the State Live Stock Sanitary Commission.

House bill No. 153, introduced by Mr. Ames, entitled "A bill to establish and maintain a State hospital for consumptives and to make an appropriation therefor," was, perhaps, one of the most important proposed enactments, from the sanitarian's point of view, asked for during the session of the legislature of 1901. It is a measure long and seriously considered by the. State Board of Health, and one which experience in other states has now taught is feasible, in the restriction and prevention of this most fatal of diseases.

Senate bill No. 87. At its annual meeting, the State Medical Society appointed a committee, under the chairmanship of Dr. Herbert Maxon King of Grand Rapids, at the instigation of which committee, Mr. Loomis introduced Senate bill No. 87, "A bill to establish a State sanatorium, in some suitable locality, for the treatment of incipient pulmonary tuberculosis, and making an appropriation therefor." It is believed that the discussion of these two bills for sanatoria for consumptives will be fruitful, and that the united efforts of the State Medical Society and the State Board of Health will secure the desired legislation on this subject, perhaps at the next session of the legislature.

An important measure which was presented and advocated by Secretary Baker before the 1901 annual meeting of the State Veterinary Medical Society, and endorsed by that society, was House bill No. 1050, introduced by Mr. Weter, entitled "A bill to provide for the inspection of animals intended for meat supplies, of slaughter houses, markets, and of meat intended for consumption, in cities and villages." This bill was framed by Dr. Baker, aided by many physicians, veterinarians and other persons interested in the public health, at the request of Dr. J. H. Kellogg, chairman of a committee of the State Medical Society appointed to secure legislation on this subject. Dr. Kellogg made an extensive exhibit of diseased meat, which showed in a graphic manner the necessity for such a law.

House bill No. 108, introduced by Mr. Ames, as subsequently amended by the House committee on judiciary, with the approval of members of the State Board of Health, was as follows:

A bill to amend section 15 of chapter 35 of the Revised Statutes of 1846, relative to the preservation of the public health, quarantine nuisances and offensive trades, as amended by act 97 of the Public Acts of 1895.

The People of the State of Michigan enact:

SECTION 1. That section 15 of chapter 25 of the Revised Statutes of 1846, relative to the preservation of the public health, quarantine nuisances and offensive trades, as amended by act 97 of the Public Acts of 1895, be and the same is hereby amended so as to read as follows:

SEC. 15. When any person coming from abroad or residing in any township within this State shall be infected or shall lately before have been infected with the smallpox or other sickness dangerous to the public health, the board of health of the township where such person may be shall make effectual provisions in the manner in which they shall judge best for the safety of the inhabitants by removing such sick or infected person to a separate house, if it can be done without danger to his health, and by providing nurses and other assistance and necessaries, which shall be at the charge of the person himself, his parents, or other persons who may be liable for his support, if able; otherwise, as a charge to the township, city or village to which he belongs: *Provided,* That the health board shall keep and render an itemized and separate statement of expenses incurred in so caring for each person: *And provided further,* The board of supervisors of each county in the State shall have power to examine into, audit and allow, and order paid by the county, in whole or in part, any claim incurred in the care of persons sick with a communicable disease, dangerous to the public health, or incurred in preventing the spread of such disease, whenever in the opinion of a majority of all of the members of said board the township, city or village liable for such claim should be relieved in whole or in part from the payment of the same.

This bill was passed by the house and senate, but was not approved by the Governor.

At the present time, in all but three counties, practically all charges for the restriction and prevention of dangerous communicable diseases are payable by the county, and the immediate burden for payment being thus removed from the locality where the expenses are incurred, the expenses are in many cases very large. It was hoped that the enactment of a law similar to this bill would result in reduced taxation and less sickness from preventable disease.

ANNUAL ADDRESS
OF THE PRESIDENT OF THE STATE BOARD OF HEALTH.*

EPIDEMIC OF SMALLPOX.—LESSENED SICKNESS AND DEATH-RATE FROM COMMUNICABLE DISEASES.—FINANCIAL NEEDS.—TENURE OF OFFICE OF THE SECRETARY OF THE BOARD.

BY HON. FRANK WELLS, PRESIDENT OF THE STATE BOARD OF HEALTH, LANSING, MICHIGAN.

Among the events of the year of interest and importance to this Board is a change in the personnel of its membership arising from the resignation of Prof. Fall, elected to the position of Superintendent of Public Instruction, and the expiration of the term of office of Judge A. V. McAlvay. Both gentlemen were valuable members of the Board, in hearty sympathy with its aims, and both exhibited their zeal by their almost uniform presence at its meetings and their willingness to accept their share in its labors and responsibilities.

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*April 12, 1901.

In their places Governor Bliss has appointed Prof. Victor C. Vaughan, Dean of the Medical Department of the University, and Mr. Henry A. Haigh of Detroit. Prof. Vaughan has already served two terms as a member of the State Board of Health, and his important services during those periods are well remembered by several of us who had the pleasure of serving with him during one or both of those terms. Mr. Haigh, a clerk in the office of the Board in its earlier years, has since that period not only kept in touch with the work but has on several occasions rendered valuable service through his advice and active efforts in its behalf. Mr. Haigh has already signalized his appointment by excellent presentations to committees of the legislature of information concerning some of the needs of the Board.

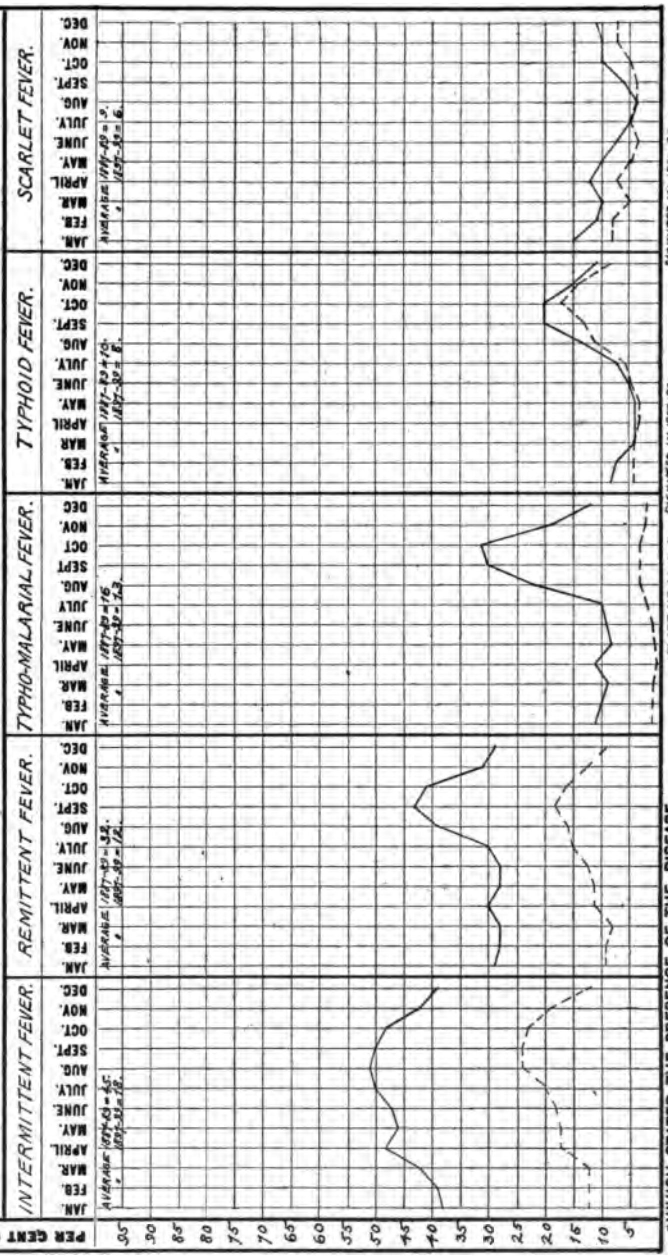
Smallpox epidemic.—The year has been marked by a large and continuing increase of smallpox, not only in Michigan, but throughout the country. On the first of January forty-four of the States and Territories of the Union were more or less infected with this disease. Modern facilities of communication render it practically impossible to prevent the spread of smallpox or any other disease by means of the ancient methods of quarantine, and such methods are, therefore, by nearly all intelligent communities abandoned. Moreover, science and experience have so thoroughly demonstrated that this disease can not only be controlled but be made to substantially disappear by vaccination, that no other measures are necessary where vaccination is employed. The exceedingly mild type which this disease has assumed since it began to take on epidemic proportions about three years ago is one of the principal reasons for its spread. It has been very generally diagnosed at the beginning of outbreaks as chicken-pox, or as some other mild skin disease, with frequently no attempt at isolation of the sick or protection of the well by vaccination. Had its old-time mortality prevailed of fifty to seventy-five per cent of deaths, with the disgusting disfigurement of the persons of those who recover, the entire country would today be panic stricken. It is quite possible that the present mild type may in time develop into the more malignant type unless the practice of vaccination and revaccination becomes general and the disease thus stamped out.

Since our last meeting the resources of the office of this Board have been exerted to their utmost limit, to keep abreast of the increased work due to the outbreaks of smallpox in Michigan. These number, since the beginning of the year, about 190, and there are at the present time about 100. To successfully cope with this disease should it assume a more serious aspect, or to contend with an epidemic like the bubonic plague, which has already reached our western border, would be impossible by this Board unless funds much beyond its present small appropriations were placed at its disposal for that purpose.

Possibilities of an outbreak of bubonic plague.—The history of the outbreak of bubonic plague in California is very instructive. The disease has been known to exist in the Chinese quarter of San Francisco for over a year. Little or no attempt has been made to suppress it, and it is openly charged that efforts have even been made to withhold the facts regarding it, by the authorities. The seriousness of the danger has now

COMPARATIVE SICKNESS IN MICHIGAN.

DIAGRAM.—REPRESENTING THE SICKNESS IN MICHIGAN FROM INTERMITTENT FEVER, REMITTENT FEVER, TYPHO-MALARIAL FEVER, TYPHOID FEVER, AND SCARLET FEVER, BY MONTHS IN EACH OF TWO PERIODS OF THREE YEARS EACH, 1887-89, AND 1897-99. THE AVERAGE DECREASE OF INTERMITTENT FEVER WAS 60 PER CENT, REMITTENT FEVER 63 PER CENT, TYPHO-MALARIAL FEVER 92 PER CENT, TYPHOID FEVER 20 PER CENT, AND SCARLET FEVER 33 PER CENT.



*WHICH STATED THE PRESENCE OF THE DISEASE. (PLATE NO. 1072.)

THE DECREASE IN INTERMITTENT FEVER WAS PROBABLY DUE TO GENERAL DRAINAGE THROUGHOUT THE STATE. THE DECREASE IN TYPHO-MALARIAL FEVER MAY BE ACCOUNTED FOR PARTLY BY THE FACT THAT, IN RECENT YEARS, THIS FEVER HAS GENERALLY BEEN REPORTED AS TYPHOID FEVER; THIS WILL ACCOUNT, IN SOME MEASURE, FOR THE APPARENT SMALL DECREASE IN TYPHOID FEVER; THE REAL DECREASE IS MORE NEARLY SEEN BY ADDING THESE TWO TOGETHER.

Whatever other influences may have aided to bring about these large reductions, that of the State Board of Health was undoubtedly the most potent, for the reason that previous to and during the period it had by every method which seemed most promising been furnishing to the people knowledge concerning the causes of these diseases, and how they could be restricted. These efforts were not confined to imparting this knowledge to those who had been exposed to these diseases, important as this was, but the public schools of the State during the later portion of the period were invaded and their pupils furnished with this important knowledge. When we add to these, sanitary conventions for purposes of instruction, held as frequently as its funds would allow, and conferences of local health officers, it must be clear that the educational influences of the Board have been most extensively diffused throughout the State. It is reasonable to assume, therefore, that these influences have been those most potent in the promotion of the results already achieved, as shown by these reports.

It has been the policy of this Board so soon as science and experience had demonstrated that a disease was of a dangerous character and communicable, to direct its energies to its restriction. In pursuance of this policy one after the other smallpox, measles, scarlet fever, typhoid fever, diphtheria and consumption have engaged the attention of the Board and have been subjected to its methods. Consumption, the last of these diseases, and seemingly the most hopeless of them all, proves happily no exception in the results which have uniformly followed these methods, and deaths caused by it have shown a remarkably regular diminution since the efforts of this Board for its restriction were begun about ten years ago. This diminution is equivalent to fully eleven per cent each year. These facts concerning successes thus far achieved are important, not only in themselves, but because they lead to the belief that several other diseases which have received but limited attention from this Board, but which I think there is now sufficient evidence to prove belong to the class known as communicable, and which have for several years been increasing in importance as causes of sickness and death, may be made to yield to similar efforts.

New lines of work recommended.—Among these I may name pneumonia, influenza, diarrheal diseases of children, and cancer. The first three are largely influenced by climatic conditions, two being cold-weather diseases, and the other most prevalent in the hot months of the year. Cancer prevails at all seasons, and its ravages seem to be steadily increasing. It has not generally heretofore been regarded as a germ disease. It bears, however, the general characteristics of this class, and several recent investigators claim to have discovered its specific cause, and proved its communicability.

This Board has always taken positions in advance of general public belief, concerning the contagious and infectious diseases, and I think it should continue to do so. I would deprecate as much as anyone the taking, by this Board, of any important step in this direction not warranted by clinical knowledge or laboratory tests of a convincing character. These certainly are not wanting in the first three diseases named, and for these this Board has thus far confined its efforts to publishing a pamphlet upon one, pneumonia. They should probably all be classed with consumption so far as their not requiring, under proper conditions,

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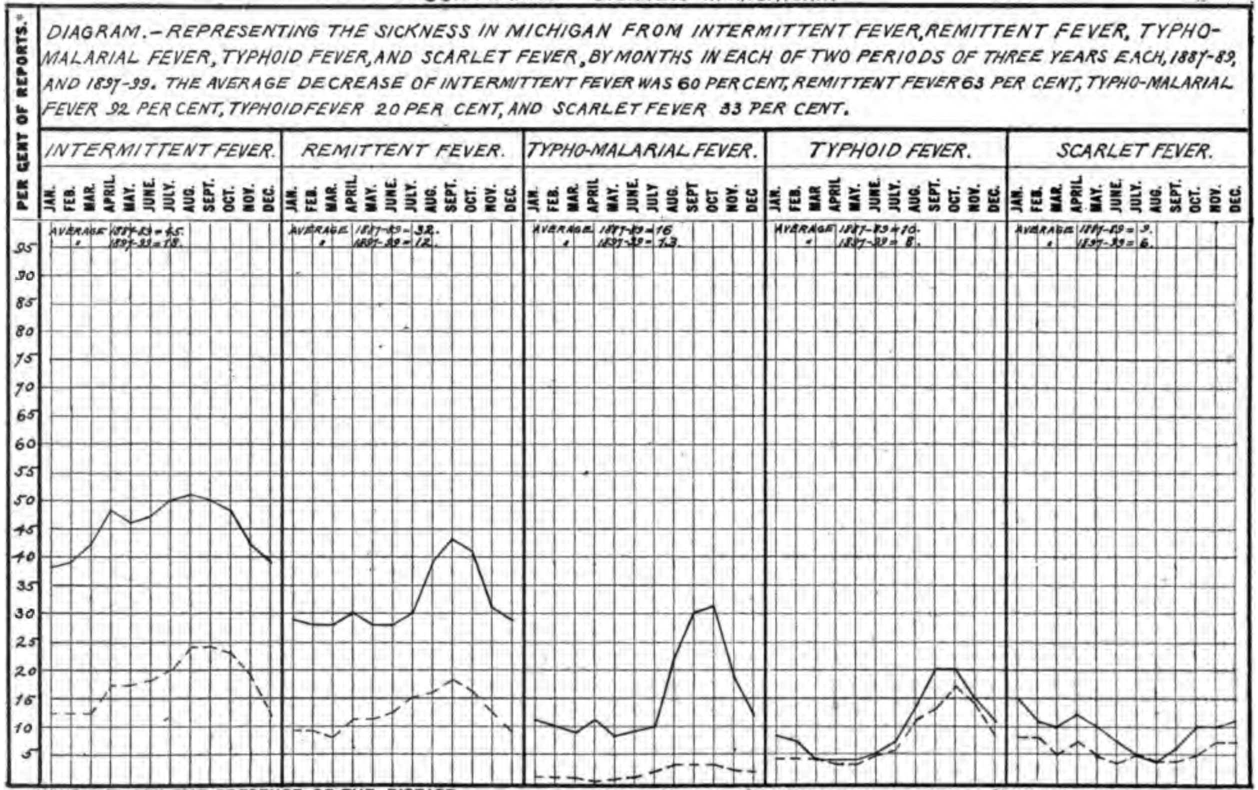

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Feeling this responsibility myself, and having in view the seriousness of the diseases named, I recommend that a committee of the members of this Board be appointed to report at our next quarterly meeting whether any steps should be taken at this time to endeavor to restrict the spread among the people of cancer, that another committee be appointed to make a similar report concerning infantile diarrhea, that a third committee be appointed to report whether any further steps should be taken by this Board to restrict the spread of pneumonia, and whether anything should be done to restrict the spread of influenza.*

Appropriation needed.—I make these recommendations in the hope that the bill now before the legislature to increase the appropriation for the use of this Board five thousand dollars, for general purposes, will be passed. Unless the fund for these purposes is increased, it is difficult to see how even the lines of work already inaugurated can all proceed. When it is borne in mind that this Board, organized twenty-eight years ago with an appropriation of $4,000 per annum, to pay the salary of its secretary, its entire office expenses including postage, stationery, and the expenses of its members in attending meetings, has never had a dollar's increase in its appropriation for these purposes, it is a matter of surprise that so much has been accomplished. It is true that eight years afterwards an annual appropriation of $2,000 for sanitary conventions, purchase of instruments, and similar purposes was made, and that a few years ago another special appropriation to carry into effect an act of a previous legislature regarding teaching in the schools of the State, for which the Board was required to furnish the data, was passed. Not a dollar of these, however, can be used except for the specific purposes for which they were appropriated.

Unusual demands upon the resources of the Board, like the present outbreak of smallpox, very soon use up its entire available balance for the year, frequently without then accomplishing all that should be done to meet such demands. At the present time the Board has less than one hundred dollars on hand available for general purposes during the next three months, with a disease as serious as smallpox existing at over one hundred places in the State. Our only hope of relief is in the passage by the legislature of the bill adding five thousand dollars to the appropriation for general purposes for the use of the Board. This bill is

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[*In accordance with the recommendations of the president the following committees were appointed: Cancer. Dr. Belknap; diarrheal diseases of infants, Dr. Vaughan; pneumonia and influenza, Dr. MacLachlan.—H. B. B., Sec., S. B. of H.]

now in the hands of the committee on Ways and Means of the House. It was referred to this committee handicapped by being reported out from the committee on Public Health of the House without recommendation. The reason assigned by the chairman of the committee on Public Health for not reporting the bill favorably was that a prejudice existed in the minds of some members of the committee against the secretary of this Board, Dr. H. B. Baker, and that for this reason the committee would not recommend any increase in the resources of the Board. This prejudice had already found expression in the passage of a bill by the Senate amending the act organizing the Board, reducing its membership to six, and requiring that a secretary should then be selected from these six members.

Bill amending act organizing State Board of Health.—The reason assigned by Senator Pierson, who introduced Senate bill 110, File 49, and actively advocated its passage in the Senate, for limiting the choice of a secretary to the six members to constitute the Board, was to get rid of Dr. Baker as its secretary. It was stated by him that in no other way could this result be secured. Every member of this Board knows and every other person can learn, by referring to the act creating the State Board of Health, that its secretary can be removed for incompetency or any other good and sufficient cause at any meeting of the Board. There undoubtedly is a strong feeling against the tenure by which the office of the secretary of this Board is held, and I am persuaded that the sooner we recognize how deep-rooted this prejudice is, and favor a periodical election to this office, the sooner we shall secure very much legislation needed to promote the public-health interests of the State. The mere retention of a system for appointing to or holding an office should not stand in the way of these most important interests.

With this bill modified so as to provide for the continuation of the membership of the Board at its present number (seven), the selection of the secretary left to the choice of the Board without limitation, his term of office definitely stated, and even his exclusion from membership of the Board, I should regard its passage as no serious detriment to the health interests of the State. If its passage would relieve the apprehension of any who regard the incumbency of an office limited only by the ability to sustain charges against its incumbent as a serious evil, I do not believe the members of this Board should object to the change contemplated by it. The passage of the Pierson bill unmodified by two of the changes I have suggested (the continuation of the membership of the Board at seven instead of six as contemplated in the bill, and not limiting the choice of a secretary to one of these six members) would prove a most serious evil. As several members of the Board are physicians who cannot always leave their patients to attend meetings of the Board, it is even now sometimes difficult to secure a quorum for the transaction of business. With its membership reduced to six, the same number required for a quorum now (four) would be required then. The chances for this number being present would be lessened, and the expenses of those who might attend would have to be paid without the possibility of holding a meeting to do business. A similar objection would hold were the number of members reduced to less than six.

A still more serious evil would be to restrict the Board to its members in the selection of a secretary. I believe the office of Secretary of the State Board of Health to be second to none other in importance in the State, and for this reason his selection should be unlimited even by State lines. The possibility that no member of the Board might be willing to accept the position or, if willing, that he could not secure the necessary votes to elect him, are sufficient reasons, if there were no others, why the choice should not be thus confined.

In view, therefore, of the fact that the present tenure of office of the secretary of this Board seems to stand in the way of important legislation in the interests of the public health of the State, I believe it best that the law be changed so that the secretary shall be elected for a specified period of perhaps five years.

Influences unfriendly to the work of the Board.—Two classes of the community are, and probably always will be, unfriendly to the work of this Board. One is composed of those who have, contrary to their inclinations, been required to do things which knowledge and experience have shown to be necessary for the prevention of sickness and death. The other, a much larger class, is composed of those who are ignorant of the work done by this Board and seemingly do not care to learn anything concerning it. Each class to some extent merges into the other and both unite to obstruct our labors and to retard our efforts. If both these classes could be made to see the truth and to realize that the State Board of Health is not merely a gatherer of statistics but that it is a center relied upon to furnish necessary knowledge in numerous ways for restricting disease, to settle questions when appealed to during any outbreak of such as are communicable, to keep local health officers in their line of duty all over the State, and by co-operation with these officials to see that every such outbreak is confined to the individual or family where it originates, unfriendly feeling would rapidly change to deepest interest and sympathy.

As you know, the highest praise of health officials and others interested in health work, not only in Michigan but in every other State and Territory of our country, has been bestowed upon the work and accomplishment of this Board. To have earned the appreciation of the classes most familiar with this work and these successes, should stimulate us to further effort, and should induce those not thus familiar to learn something of their accomplishments, and if possible assist in this noble work of preventing sickness and premature death.

Pleasant relations of members of the Board.—As the time for which you so kindly elected me to serve as your presiding officer closes today, I desire once more to express my appreciation of the pleasant relations which have existed between us during this period.* I am happy to note, as I retire from my official position today, that the most courteous consideration has always been shown by each member towards myself and towards each other at our meetings. For this consideration, which has rendered these meetings most agreeable, harmonious, and profitable, I thank you all.

[*Later in the meeting, Hon. Frank Wells was unanimously reelected president for the ensuing two years.—H. B. B., Sec. S. B. of H.]

GENERAL WORK IN THE OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH DURING THE FISCAL YEAR ENDING JUNE 30, 1901.

Much of the work of this office naturally groups itself under three heads,—the collection of information, the compilation and elaboration of information, and the dissemination of information. In the following outline that grouping is adhered to so far as is practicable without repetition.

COLLECTION AND COMPILATION OF INFORMATION.

Return of names and postoffice addresses of health officers.—There is a local board of health in every township, and in every incorporated city and village in Michigan.

Every local board of health in Michigan is required by law to appoint and constantly have a health officer, and to report his name and address to the Secretary of the State Board of Health at Lansing.

Blanks for the return of the names and addresses of health officers are sent out by the Secretary of the State Board to the local health officers about the first day of April, the law (Sec. 4411, C. L. 1897; Sec. 46, P. H. L. 1899) requiring the appointment and return to be made "within thirty days after the annual township meeting in each year."

In April, 1901, the usual demand was made upon supervisors of townships, presidents and clerks of villages, and mayors and clerks of cities, for the return of names and postoffice addresses of health officers to serve in 1901-1902. The circular and blank forms are similar to those printed on pages xiii-xiv of the report of this Board for 1884. In June, 1901, a second demand was sent to localities from which no return had been made in response to the demand in April. On the outbreak of a dangerous communicable disease in a township, city or village, in which no health officer had been reported, a third and even a fourth demand for the appointment of such officer, and the return of his name has been made; therefore, the number of health officers returned increases until the close of the year for which such officers are appointed. At the close of the fiscal year ending June 30, 1901, the numbers of health officers in townships, cities and villages were as follows: Townships, 1,206; cities, 79; villages, 307.

Through the systems of reports to the State Board of Health by its corps of correspondents, as well as by the local health officers, by the systematic searching of the local columns of country newspapers published in Michigan, and by a diligent search of the reports of deaths to the Division of Vital Statistics in the office of the Secretary of State, the Secretary of the State Board of Health often receives information of an outbreak of a communicable disease and desires to communicate at once with the local health officer; but if no health officer has been appointed in that locality, or no return of such appointment has been made, delay occurs, and before the secretary is able to establish authentic communication with the local board of health, and a health officer can be chosen, the disease may spread widely within or without the limits of a village or a township, with unnecessary sickness and loss of life. It should be said, however, that there is an increasing tendency to comply with this law, and local boards now generally act promptly and coöperate cordially with the State Board of Health in its endeavors to prevent the spread of dangerous communicable diseases.

Special reports relative to dangerous communicable diseases.—Every health officer is supplied with blanks [L] from this office, for reporting outbreaks of diphtheria, scarlet fever, typhoid fever, smallpox, measles, etc. (dangerous communicable diseases), to the Secretary of the State Board as required by law. A special blank [S.] for reporting outbreaks of consumption is also supplied local health officers.

Upon the receipt of the report of an outbreak of such disease, blanks [M.] for weekly reports so long as the outbreak lasts, are sent, with a circular letter ("Blue Letter"), also a number of pamphlets containing instructions for the suppression of the disease. These pamphlets are to be distributed to the neighbors of the family in which the disease is, in order to educate them to the importance of their duty under the law, and to secure their coöperation with the health officer.

About 5,893 outbreaks of such diseases were thus attended to during the fiscal year, 1901.

Later, a blank is sent to the health officer of each jurisdiction for a final report at the close of the outbreak, stating just what was done for the restriction of the disease, and with what result—the number of cases and deaths, households invaded, what disinfections were used, what exceptions, and other facts supplying data for guidance of future efforts.

The facts thus collected are compiled for publication in the annual report of the Secretary of the State Board of Health. In this annual report will be found the report of the facts relative to the dangerous communicable diseases in Michigan in the year 1900.

Annual reports by health officers for the year ending December 31, 1901.—In January, 1901, a circular [218] was sent to the health officer of each township, city and village in the State, about 1,583 in all, transmitting a blank form [I] for use in making his annual report to this office. This circular was substantially the same as circular [65] which is printed on pages viii-ix of the report for 1884. Blank form [I] for reports of health officers is printed in former reports. With the circular [218] was also transmitted a blank for a copy of a record of diseases dangerous to the public health, similar to the blank which is printed on page 271 of the report for 1882.

Where the name of the health officer has not been returned the blanks were sent to the president of the village, the mayor of the city, or the supervisor of the township, according as the vacancy occurred in a village, city or township.

In case this failed to secure the return in accordance with the State law, the aid of the prosecuting attorney was requested. This has had the effect of securing a more complete return of reports of health officers.

Annual reports by clerks of local boards of health discontinued.—Since the change of the law (Secs. 4452 and 4453, Compiled Laws 1897; Secs. 87 and 88, Public Health Laws 1899), went into effect, reports of cases of "diseases dangerous to the public health" are not made by the clerk; and, unless it has been impracticable to secure a satisfactory report from the health officer, no demand was made upon the clerk for an annual report.

Meteorological reports.—A list of meteorological observers for the calendar year 1900, with a statement of what registers were received from each, is printed in this report. The reports are summarized in an article in this report on "The Principal Meteorological Conditions in Michigan in 1900," commencing on page one of Part II. The data are of great value for the purpose of studying the causes of diseases. The observations made at the office of the Board at Lansing have been summarized weekly, and a copy placed on file in the office.

DISSEMINATION OF INFORMATION.

Published list of names and addresses of health officers.—The names and addresses of 1,476 health officers in Michigan, to serve in 1901-1902, were collected and printed.

Distribution of information how to restrict and prevent dangerous communicable diseases.—Whenever information was received of the first occurrence of diphtheria, scarlet fever, typhoid fever or typho-malarial fever, measles, whooping-cough, consumption, smallpox or cerebro-spinal meningitis, copies of a document on the restriction and prevention of the disease reported were immediately sent to the health officer with a request that he distribute them where they will be most likely to be read, and it was suggested that the neighbors of those families in which the sickness occurs would be most likely to read them at such times of danger, and it was thought that after reading them they will be most likely to coöperate with the local health officer for the restriction of the disease. Thousands of pamphlets on the most dangerous communicable diseases are distributed by the State Board Health in this manner, in localities where the disease treated of in the pamphlet is present. They are being distributed in this way all the time, because there is no time when the State is free from consumption, scarlet fever and diphtheria, these being the most important of the dangerous communicable diseases in Michigan. Copies of the documents on diphtheria, scarlet fever and smallpox, in German or in Dutch, are also sent when it is thought they can be used to advantage. Owing to frequent requests for documents in French, Polish, Swedish and Danish Norwegian, translations of a leaflet [47] on contagious diseases have been made into each of these languages, and copies sent to local boards of health when requested.

A record is kept of reports received, and of correspondence relative to each outbreak of a dangerous communicable disease of which the office receives information. A compilation of such information relative to the most important diseases is published in this volume.

Printing and distribution of the secretary's annual report.—Comparatively few copies of the annual report of the secretary are published; the whole number is not so large as the number of officers and members of local boards of health in Michigan. In accordance with the provisions of Section 10, Act No. 44, Laws of 1899 (Sec. 14, Public Health Laws 1899), only 4,000 copies of the annual report are published, 2,000 copies less than have ordinarily been published, but about the same number of copies is allowed for distribution by the Secretary of the State Board of Health (about 3,800). The reports are sent in exchange to sanitary journals, other State Boards of Health, city boards of health in other States, health officials in other countries, libraries, to physicians in Michigan who contribute to the work of the Board, and to persons who request copies of the report.

Instructions to newly appointed health officers.—As fast as the names and addresses of health officers to serve in 1900-1901 were received, a copy of the bulletin [120] detailing the duties of health officers and of local boards of health, was sent to each one who had not served during the preceding year, together with blanks "L" and "M" for the prompt report of any dangerous communicable diseases, and sample copies of pamphlets on the restriction and prevention of diphtheria, scarlet fever, typhoid fever, measles, whooping-cough, meningitis and consumption; also a slip (224) relative to consumption being a dangerous communicable disease, and a short statement relative to its restriction and prevention; a leaflet [281] on the modes of spreading and the best methods for the restriction and prevention of dangerous communicable diseases; several leaflet diagrams showing the results for recent years in the restriction of diphtheria, scarlet fever, typhoid fever, measles and consumption, and two diagrams showing a comparison between the numbers of deaths from typhoid fever in sewered and unsewered localities.

The Teachers' Sanitary Bulletin is now in its fourth volume. During the fiscal year, aside from a large number of shorter articles and items relating to various phases of public health work and teaching, the following articles appeared in the Bulletin:

Bacteriology in its Relations to Public Health, by Prof. F. G. Novy (August, 1900).
Michigan Water Supplies, by Gardner S. Williams (September, 1900).
State Sanatoria in Michigan, by Dr. Herbert M. King (October, 1900).
Dangerous Communicable Diseases, How Spread, How Restricted and Prevented (February, 1901).
Annual Address to the State Board of Health of President Wells (April, 1901).
Outline of Physiology and Hygiene for Schools, by Prof. Louis Murbach (May, 1901).
Plan for a Practical School Course in Microscopic Biology, Dr. C. V. High (May, 1901).
Formaldehyde Disinfection of Rooms, Books, Papers, Money and Letters (June, 1901).

This Bulletin is published to enable the teachers in the public schools of the State to better comply with the provisions of Act 146, of 1895, which requires that facts relative to the modes of spreading, and best measures for the restriction and prevention of the dangerous communicable diseases be taught in every public school. It is sent gratuitously to all teachers whose names and addresses can be obtained. The secretary will be grateful for all information relative to the names and addresses of teachers in Michigan, or changes therein.

Reprints.—Reprints of articles in the report and in proceedings of sanitary conventions, have been made in pamphlet form, and sent in answer to queries in letters that can be best answered in that manner.

Instructions to local health officers by telephone, telegraph, etc.—There are in Michigan about 4,500 officers of local boards of health (presidents, clerks, and health officers), many of whom are newly appointed each year, and coming to the work for the first time, need to ask many questions in order to be best prepared to serve the people in their several localities. As fast as such emergencies arise, such questions are replied to by telephone, telegraph, letters, or otherwise as the occasion demands. This is one of the important functions of the central office, of the secretary and executive officer of the State Board.

Diagrams of instructive experience in Michigan.—Diagrams showing the favorable results of isolation and disinfection of diphtheria, scarlet fever, typhoid fever, smallpox, and the generally favorable results of isolation and disinfection, lives saved by public health work in Michigan, deaths from typhoid fever in sewered and unsewered localities and in cities before and after the introduction of sewerage, the relation of low water in wells and the deaths from typhoid fever have been printed and largely distributed. The evidence relative to the effect of isolation and disinfction as a preventive of the dangerous communicable diseases, gains strength as shown by the diagrams for each succeeding year compared with periods of years. The diagrams prove that in those localities in which isolation and disinfection of diphtheria and scarlet fever were enforced, only about one-fifth as many deaths occur as in those localities where isolation and disinfection are neglected. The diagrams relative to the other diseases show a greater or less proportion of life-saving through isolation and disinfection.

Pamphlets and other publications of the office.—Aside from a number of diagrams and leaflets which were printed during the year but which cannot well be enumerated here for lack of space, the tenth edition of "Dangerous Communicable Diseases: How Spread, How Restricted and Prevented" was printed in July, 1900, followed by the eleventh edition in March, 1901; the second edition of "Advice for the Restriction and Prevention of Meningitis" was printed in July, 1900; the tenth edition of "The Restriction and Prevention of Measles" was printed in August, 1900; the sixteenth edition of "The Prevention and the Restriction of Typhoid Fever" was printed in November, 1900; the sixteenth edition of "The Restriction and Prevention of Scarlet Fever" was printed in November, 1900; the eighth edition of the "Restriction and Prevention of Consumption" was printed in May, 1901; Reprints were also made of some of the articles in the annual report for 1900.

Summer resorts and their sanitary condition.—Perplexing questions have arisen at some of the Michigan summer resorts, which bid fair to prove of great importance if not satisfactorily settled. They relate to the subjects of water-supply, sewerage, the disposal of night-soil, garbage, etc.

Before the various localities in the State had become famous as summer resorts, there was scarcely necessity for serious contemplation of these subjects in those localties, but now, when populous cities are established for a few months in the year at many summer resort localities in the State, the subject of their sewerage becomes a serious one, and local health officials have been at a loss how to make regulations which may be enforced in one of these summer cities, and yet not work an injustice to other portions of a not otherwise thickly-populated township. With this condition of affairs in view, and at the request of a health officer of such a jurisdiction, rules and regulations were drawn up, which might be made applicable to all such places in the State, and which were as follows:

PROPOSED REGULATIONS RELATIVE TO SUMMER RESORTS.

Regulations for the restriction and prevention of disease, adopted.........., 190.., and published by the board of health of the township of.............., ... county, Michigan. From and after this date, these rules shall be in effect during the months of June, July, August and September, in each year, in all parts of this jurisdiction where any occupied dwelling house or place is within twelve rods of another occupied dwelling house or place.

Regulation I.—No garbage nor refuse shall be thrown upon the ground; but shall be deposited in water-tight wood or metal cans or receptacles provided with tight covers. Said cans shall be emptied as often as twice each week.

Regulation II.—All privies shall be provided with removable water-tight receptacles; and sufficient dry earth or other approved absorbents shall be used daily to absorb all the fluid parts of the deposits; and the entire contents of such receptacles shall be removed as often as once every week.

Regulation III.—No water closet shall be used except it have connection with a sewer which shall deliver the sewage at least .... rods from any inhabited building.

Regulation IV.—No cesspool nor reservoir into which a stable or sink is drained, except it be water-tight, shall be permitted, and all such cesspools or reservoirs shall be provided with a "trap intake." Nothing but fluids shall be permitted in such cesspools or reservoirs. They shall be emptied and disinfected at least once a year. The contents shall not be emptied within .... rods of any inhabited dwelling place.

Regulation V.—All stable manure shall be removed as often as once a week; and all stables located within fifty feet of any residence or dwelling place shall be kept thoroughly cleaned and no manure or other offensive material shall be allowed to remain uncovered so that flies can have access to it.

Regulation VI.—All accumulation of decaying leaves or other vegetable matter shall be promptly removed.

Section 4466, Compiled Laws of 1897 (Section 98, Public Health Laws, 1899), authorizes township and village boards of health to make regulations relative to privies and water closets, "or such boards may declare any such privies or water closets a nuisance, and the abatement thereof be by them ordered and enforced."

Immigrants possibly exposed to dangerous communicable diseases.—During the first six months of 1901, a notice was received from the U. S. Commissioner of Immigrants, at Philadelphia, Pa., that diphtheria had occurred on board a steamship arriving at that port; and four notices were received from the immigrant officer, at Quebec, Canada, that measles had occurred on board two steamships, typhoid fever on board one steamship, and scarlet fever on board one steamship, arriving at points in the province of Quebec; all the steamships having on board immigrants destined to settle in Michigan. Copies of the several notices were promptly mailed to the health officer of each jurisdiction to which the immigrants were going, with the request that a surveillance be maintained over the immigrants until after the danger of the diseases occurring in them, or being spread from them to others was past. A statement of the arrival of immigrants in Michigan in the calendar year, 1900, together with a copy of the blank upon which the notices to health officers are made, may be found in the article on "Communicable Diseases in Michigan in 1900," on subsequent pages of this report.

Publication of proceedings of meetings of the State Board of Health.—Abstracts and brief accounts of the proceedings of meetings of the State Board are prepared, hektographed or printed, and distributed as soon as practicable after each meeting. Abstracts of the minutes of meetings have in former years been printed in Part I of the secretary's annual report, but since the report for 1899 they have been omitted from the report on account of the restriction of the size of the volume; but a record is kept in the office of the secretary. The distribution of these abstracts is not the same for all meetings, being to different classes of persons according to the nature of the contents, as the action of the Board or its deliberations may be appropriate. In some instances they are sent to sanitary and medical journals, in others to teachers, health officers and others, and frequently to the members of boards of control of the different State institutions.

Secretary's quarterly reports of work in the office.—At the close of each quarter, the secretary prepares a brief report of the work done in the office. This report is presented, and portions of it sometimes read at the next regular meeting; and, if the abstract of the proceedings of the meeting is printed, this report is printed in the same pamphlet. Because of lack of funds it has not been practicable to print the quarterly abstract of proceedings of meetings in this fiscal year.

REPORT OF THE SECRETARY RELATIVE TO PROPERTY, ETC., FOR THE FISCAL YEAR ENDING JUNE 30, 1901.

To the President and Members of the Michigan State Board of Health:

GENTLEMEN—In compliance with Section 5 of Article II of the by-laws of this Board, the following report of the "Nature and amount of property belonging to the Board, which has been received, issued, expended, and destroyed since the last report, and of property remaining on hand, and also in whose care each item of property is intrusted," is respectfully submitted:

Preceding reports should enable one to learn the items of property on hand at the beginning of the fiscal year 1900. My last report is printed on pages xx-xxii of the Annual Report for 1900. Since last report, instruments and articles of a similar nature have been purchased as follows:

Photo-engraved plates purchased.

Fifteen plates relating to the meteorological conditions in Michigan in 1899.

One plate—Water supplies and death-rates from typhoid fever in several American and Foreign cities.

One plate—Water supply and sickness from typhoid fever at barracks, Wittenberg, Germany.

One plate—Water supply and sickness from typhoid fever at Lausen, Switzerland.

One plate—Water supply at Grand Rapids, Mich.

One plate—Isolation and disinfection restricted diphtheria in Michigan in 1889.

One plate—Isolation and disinfection restricted scarlet fever in Michigan in 1889.

Five plates relating to weekly reports of sickness in Michigan in 1899.

One plate—Isolation and disinfection restricted typhoid fever in Michigan in 1899.

One plate—Isolation and disinfection restricted measles in Michigan in 1899.

One plate—Distribution of consumption in Michigan in 1899.

One plate—Distribution of meningitis in Michigan in 1899.

Two plates—Comparative sickness in Michigan, series of years.

Four plates relating to meningitis in Michigan in 1873, 1898, 1899, and 20 years, 1877-96.

Property loaned.

Many photo-engraved plates were loaned to the Robert Smith Printing Co., State Binders, Lansing, and to Wynkoop Hallenbeck Crawford Co., State Printers, Lansing, to be used in printing annual reports and other publications of this Board. Most of these plates have been returned, but a few still remain charged to them in the property book of this office. The plates will probably be returned as soon as the State Printers are through with them.

No instruments were purchased since last report.

Meteorological instruments issued.

One wet-bulb thermometer (to replace one accidentally broken while in use) to E. S. Pettyjohn, M. D., Alma.

Meteorological instruments returned.

One barometer box for protection, one maximum self-registering thermometer, one minimum self-registering thermometer, with boards, etc., for hanging, one dry-bulb thremometer, one wet-bulb thremometer, boards, clips, cup, and wick, one rain-gauge, with extra tube to catch overflow and measuring stick, by John A. Harrison, Conklin, Mich.

Meteorological instruments accidentally broken while in use by observers.

One maximum self-registering thermometer, by observer at Alma.

Meteorological instruments and other property on hand.

6 standard barometers (including one in use at this office).
9 dry-bulb thermometers (including one in use at this office).
8 wet-bulb thermometers (including one in use at this office).
4 minimum self-registering thermometers (including one in use at this office).
6 maximum self-registering thermometers (including one in use at this office).
1 standard thermometer.
1 standard thermometer for inspecting oils.
8 registering thermometer boards (including one in use at this office).

14 psychrometer boards (including one in use at this office).
2 psychrometer cups (including one in use at this office).
8 minimum thermometer clips.
6 psychrometer clips.
9 screw bolts for registering thermometers.
10 pins for registering thermometers.
3 hooks for hanging barometers.
6 barometer boxes.
2 rain-gauges (including one in use at this office).
2 caps for overflow tubes.
1 large galvanized iron pail, to measure snowfall.
1 Draper's self-registering thermometer.
2 anemometers for use in this office.
2 circular magnifying hand glasses.
9 psychrometer cups, injured by use, can be repaired.
3 psychrometer cups, spoiled by rust and long use.
35 broken thermometers (includes all, since observations have been taken).
1 worn-out anemometer spindle.
1 hard rubber triangle, 13 inch.
1 hard rubber triangle, 6 inch.
1 dotting instrument.
1 adjustable curve ruler.
1 parallel ruler, wood.
1 parallel ruler, hard rubber.
310 sheets ozone test-paper.
4,320 ozone slips.

The following table shows the amount and kind of hard paper there was on hand at the time of making the last report, the amount purchased during the year ending June 30, 1901, the amount used, and the amount on hand at close of year:

Kind of paper.	On hand at last report.		Purchased since last report.		Used during the fiscal year.		On hand June 30, 1900.	
	Reams.	Sheets.	Reams.	Sheets.	Reams.	Sheets.	Reams.	Sheets.
Flat	2	326			2	326		
Crown	5	125	6		9	25	2	100
Folio post	16	275	50		44	353	21	402
B. Hornet (linen)	1	290					1	290
Demy	6	402	1		4	4	3	398
Medium	1	354			1	78		276
Byron Weston		81	4		3	268		293
Imperial	1						1	
Letter heads, office (linen)		6,151		13,000		6,814		12,337
Letter heads, members (linen)		460		1,000		1,070		390
Foolscap	1	36				96		420
Legal cap		415		120		215		320
Blotting paper		409	1		1	9		400
Blue cover paper	1	285	10		2	425	8	340
Postoffice paper	1	200					1	200
Book paper, S. S. S. white	1	15				95		400
Manila	3	218	4		4	218	3	

There are now on hand 9,180 sheets of hard paper of half letter size. There were about 180,314 envelopes on hand at the time of making the last report; 282.500 of the various kinds used in the office have been purchased since, making a total of 462,814. There are now on hand 103,346 printed envelopes, and 132,785 blank envelopes, making a total of 236,131. About 226,683 have been used in the work of the office.

TOTAL AMOUNT AND CLASSIFICATION OF EXPENDITURES BY THE STATE BOARD OF HEALTH (UNDER ACTS 81, 1873, AND 241, 1881), AS PER VOUCHERS 3169-3172, 3174, 3175, 3188-3284, 3293, 3295, 3310, 3317, 3319-3326, INCLUSIVE, ALSO UNDER ACTS 142, 1897, AND 140, 1901, AS PER VOUCHERS 105, 113-155, AND 162 INCLUSIVE, ALLOWED DURING THE FISCAL YEAR ENDING JUNE 30, 1901.

Expenses of members:—	
Attending meetings	$234 24
Other official	54 94
Instruments and books	244 04
Paper, stationery, etc.	689 88
Postage:—	
Office	2,056 62
Members	1 00
Printing and binding	1,574 91
Secretary	3,000 00
Expressage	247 10
Telegrams	43 17
Telephone	22 60
Drawing, engraving, etc.	148 13
Miscellaneous	183 37
Total	$8,500 00

EXPENDITURES ON ACCOUNT OF THE BOARD.

Note.—The appropriations ($8,500.00) at the disposal of the State Board of Health are for certain specified purposes, not including clerk hire, the publication of the annual report, or the expenses in the examination of plans for public buildings; these expenditures *on account of*, but not by the Board, are provided for by other acts of the legislature than those appropriating money to be expended by the Board, and the accounts are kept in other offices; not in the office of the State Board of Health. The accounts for clerk hire are kept by the Auditor General, and are reported in his annual report; the accounts for the publication of the annual report of this Board, and in the examination of plans for public buildings, are kept by the Board of State Auditors, and are published in the annual report of that Board.

Respectfully submitted,
HENRY B. BAKER,
Secretary.

SUMMARY FROM THE QUARTERLY REPORTS OF WORK IN THE OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH, AND OF THE CONDITION OF HEALTH IN MICHIGAN DURING THE SIX MONTHS ENDING JUNE 30, 1901.

For each regular meeting of the State Board of Health, the Secretary prepares a report of work in the office, and of the condition of health in Michigan, during the preceding quarter.

In another article, further on in this volume, entitled "Communicable Diseases in Michigan During the year 1900," is a summary, relative to the year 1900, abstracted from the quarterly reports.

This article is a similar summary, from the quarterly reports, for the succeeding six months, being the first six months of the calendar year 1901,—the last half of the fiscal year 1901, for which year this volume is the annual report. This article brings the subject up to the latest date possible, for this report.

A summary of a few portions of the quarterly reports during the six months ending June 30, 1901, is as follows:

Dangerous communicable diseases.—The number of reports of outbreaks of dangerous communicable diseases in Michigan, received from all sources and filed, and the corresponding number concerning which action was taken by this office for the six months ending June 30, 1901, are as follows: For consumption, 874; for diphtheria and croup, 310; for typhoid and typho-malarial fever, 392; for scarlet fever, 549; for measles, 200; for whooping-cough, 115; for meningitis, 228; and for smallpox, 311. Total for the eight diseases, 2,732.

The number of communications relative to dangerous communicable diseases, received and placed on file, was 12,573.

The number of communications relative to dangerous communicable diseases sent out, was 11,682.

The final reports of outbreaks received and filed were: For consumption, 779; for diphtheria and croup, 272; for typhoid and typho-malarial fever, 372; for scarlet fever, 538; for measles, 113; for whooping-cough, 50; for meningitis, 147; and for smallpox, 227. Total for the eight diseases, 2,498.

The registration and return of deaths in Michigan, to the State Department, has resulted in giving this office the first information of the occurrence of 627 deaths from consumption; 55 deaths from diphtheria and croup; 108 deaths from typhoid and typho-malarial fever; 26 deaths from scarlet fever; 4 deaths from measles; 24 deaths from whooping-cough, and 184 deaths from meningitis. A total for the seven diseases of 1,027.

The local columns of 5,715 newspapers have been looked over for reports of occurrence of communicable diseases. (This work is done by the clerk who acts as messenger and janitor, in the intervals of his performance of other duties.) This has resulted in giving this office first information of the alleged occurrence of 58 cases of consumption; 9 outbreaks of diphtheria; 60 outbreaks of typhoid and typho-malarial fever; 20 outbreaks of scarlet fever; 17 outbreaks of measles; 23 outbreaks of whooping-cough; 10 cases of meningitis, and 16 outbreaks of smallpox. A total for the eight diseases of 213. To what extent the reports of these alleged outbreaks were verified, is shown in the accompanying table.

Work in connection with sickness statistics.—When a return of the name of a new health officer was received, the printed circular [180] demanding the weekly card reports of sickness, and a hektographed circular letter describing the plan of making the card reports, together with supplies for making the reports, were sent to the health officer of each city and village, who were physicians, in active general practice of medicine. It must be remembered that the following applies only to the work on sickness statistics for the first six months of 1901, and that for the work of the calendar year 1900, reference must be made to the article on sickness statistics beginning on page 58 of this report. During the first six months of the year 1901, 4,843 blank report, receipt and return postal cards, 361 weekly record books, and 646 printed, hektographed and typewritten letters, were mailed to health officers of cities and villages, and to such physicians, in active practice of medicine, who expressed a willingness to make the reports voluntarily. About 3,070 weekly postal card reports were received and entered on the register.

The sickness statistics of Michigan, based upon these weekly card reports, are probably the most important sickness statistics in the world, and are made especially useful for the purpose of studying the climatic causation of diseases, by reason of the excellent meteorological statistics which have been collected for a long series of years. The general plan of the weekly card reports, the sickness statistics obtained from the compilation of the weekly card reports received during the year 1900, and the data obtained from the meteorological observations during the year 1900, may be found on pages 1 to 104 of this report.

TABLE 1.—FIRST SIX MONTHS 1901.—*Exhibiting the number of outbreaks of consumption, diphtheria, typhoid fever, scarlet fever, measles, whooping-cough, meningitis and smallpox, from January 1 to June 30, 1901, of which notice was received at the office of the Michigan State Board of Health; the per cent of reports, first information concerning which was received through the newspapers; the per cent of newspaper reports which were confirmed by the health officer; the per cent of reports which were denied by the health officer; and the per cent of reports relative to which no reply was received from the health officer.*

	Reports from all sources January 1, to June 30, 1901.	Per cent of all reports which were obtained from the newspapers.	Per cent of newspaper reports which were confirmed by the health officer.	Per cent of newspaper reports which were denied by the health officer.	Per cent of newspaper reports to which the health officer made no reply to notice sent from this office.
Consumption	874	7	42	17	41
Diphtheria (includes croup)	310	3	0	78	22
Typhoid fever (includes typho-malarial)	392	18	25	37	38
Scarlet fever	549	4	45	30	25
Measles	200	8	35	18	47
Whooping-cough	115	20	17	39	44
Meningitis	228	4	50	20	30
Smallpox	311	5	69	12	19
Average for the 8 diseases		8	35	29	36

An ephemeral use is made of the data contained in the weekly card reports, and of the meteorological observations at Lansing, by the publication of weekly, monthly and quarterly bulletins, "Health in Michigan." Samples of the several bulletins may be found on page 85, Report for 1891, pages lxxix, and xcii-xciii, report for 1894, and pages lxxxvi-lxxxvii, report for 1898. During the first six months of 1901 about 110 copies of the weekly bulletin were mailed each week, and about 120 copies of the monthly bulletin were mailed each month, to members of the State Board of Health and other officials and persons interested in keeping a "finger on the public pulse," also to a number of newspapers and sanitary and medical journals. The weekly and monthly bulletins are mentioned on pages 60 and 61 of this report.

Meteorology at one central station, and sickness throughout Michigan from all causes, during the first six months of 1901, being the last six months of the fiscal year compared with the first six months of 1900.—A comparison of meteorological conditions, at Lansing, for the first six months of 1901, with the meteorological conditions for the first six months of 1900, shows that in 1901 the prevailing direction of the wind was northwest and northeast, instead of northwest, the velocity 0.5 of a mile per hour less, the average temperature 0.39 of a degree lower, the average daily range of temperature 0.11 of a degree less, the average daily range of atmospheric pressure .016 of an inch less, the precipitation 0.1 of an inch less, the absolute humidity the same, the relative humidity more, the day and night ozone less, and the depth of water in the observation well 4 inches more. This data relative to the calendar year 1900 is printed in the article on meteorology beginning on page 1 of this report.

Compared with the first six months of 1900 the reports from all sources indicate an increased prevalence in the sickness from typhoid fever, diphtheria, pneumonia, scarlet fever and smallpox; and a decreased prevalence in cerebro-spinal meningitis, measles and whooping-cough, in the first six months of 1901.

The weather and the health in Michigan, in the first six months of 1901, compared with the average for the corresponding six months in the ten years 1891-1900.—A comparison of meteorological conditions, at Lansing, for the first six months of 1901, with the average for the corresponding six months in the ten years, 1891-1900, shows that in 1901 the prevailing direction of the wind was northwest and northeast, instead of northwest, the velocity 0.8 of a mile per hour less, the average temperature 1.2 degrees lower, the average daily range of temperature 0.27 of a degree less, the average daily range of atmospheric pressure .014 of an inch less, the precipitation 0.11 of an inch less, the absolute humidity less, the relative humidity more, the day and night ozone less, and the depth of water in the observation well 11 inches less.

Compared with the average in the corresponding six months in the ten years, 1891-1900, the reports from regular observers indicate that typhoid fever, diphtheria, scarlet fever and smallpox were more prevalent than usual; and cerebro-spinal meningitis, consumption, intermittent fever, remittent fever, measles and whooping-cough were less prevalent than usual, in the first six months of 1901.

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[PART II.]

PRINCIPAL METEOROLOGICAL CONDITIONS IN MICHIGAN IN 1900.

COMPARISONS OF CONDITIONS IN 1900 WITH THOSE IN PRECEDING YEARS.

A COMPILATION OF REPORTS BY OBSERVERS FOR THE STATE BOARD OF HEALTH AND FOR THE UNITED STATES WEATHER BUREAU.

COMPILED UNDER THE DIRECTION OF THE SECRETARY OF THE MICHIGAN STATE BOARD OF HEALTH.

In the annual reports of this Board, there has been published for each of the years 1877 to 1899, inclusive, a summary relative to the principal meteorological conditions observed during the year. This paper continues the subject for the year 1900. The names of the observers for that year, and the months in that year for which copies of registers of meteorological conditions were received from each, are stated in Table I. In Table II, is given the latitude, longitude, and elevation of each of these stations. In the tables, reports received from any observer for less than half the year have not been used; in some instances the "casual phenomena," not in tabular form, are used.

The principal conditions treated in the tables are temperature, relative and absolute humidity of the air, cloudiness, fogs, rainfall, groundwater levels, ozone, velocity and direction of the wind, and pressure of the atmosphere. The facts in a table on the subject of such important meteorological condition is illustrated by a diagram representing to the eye variations in the given condition from month to month through the year, at the several localities represented.

Some of these tables give not only the meteorological conditions for the year and month under consideration, but they also contain, for purposes of comparison, statements of the average conditions for the longest period available in each case.

In the latter part of the annual report for 1886, there was published an article on "The Causation of Pneumonia," in which extensive use was made of meteorological statistics, especially those relating to the meteorology of Michigan. In the annual report for 1887, in an article on "The Causation of the Cold-Weather Diseases," influenza, tonsillitis, bronchitis, scarlet fever, diphtheria, and smallpox are proved to sustain very close relations to meteorological conditions. Extensive use of meteorological and sickness statistics is made in the report for 1887, in an article entitled "The Relations of Certain Meteorological Conditions to Diseases of the Lungs and Air-Passages." In the report for 1891, "Abstract of Proceedings, April 14, 1891," in a discussion on the subject of "The Causation of Influenza," is an important use of the meteorological data, with diagrams and other evidence, showing how closely influenza is associated with atmospheric temperature, humidity, ozone, and wind. In the report for 1891, page cxxvii, is an article entitled "Relations of Certain Meteorological Conditions to Diseases of the Lungs and Air-Passages in Colorado," in which are also data relative to other States and countries. In the report for 1894, pages clix-ccxiv, is a paper on "The Causation of Influenza and Allied Diseases with Suggestions for their Prevention," in which important use is made of the meteorological data collected in Michigan since 1877. In each of the annual reports of this Board since that for the year 1877, considerable use has been made of the sickness statistics in Michigan for the complete study of which, data of the meteorological conditions coincident with the sickness is required.

TABLE I.—*Names of observers whose reports are summarized in the following meteorological tables and diagrams, their places of observation, and the counties and geographical divisions of the State in which these places are situated, and months for which reports were received from each observer.*

Name of observer.	Place of observation.	County.	Divisions of the State.*	Months (inclusive) for which registers were received.
Henry R. Patrick, Observer, U. S. Weather Bureau	Marquette	Marquette	U. P.	January to December.
A. G. Burns, Observer, U. S. Weather Bureau	Sault Ste. Marie	Chippewa	U. P.	January to December.
S. E. Wait	Traverse City	G'd Traverse.	N. W.	January to December.
F. H. Duff, Observer, U. S. Weather Bureau	Alpena	Alpena	N. E.	January to December.
D. W. Mitchell, M. D	Harrisville	Alcona	N. E.	January to December.
W. H. Fallon, Observer, U. S. Weather Bureau	Grand Haven	Ottawa	W.	January to December.
J. W. Cronk, Observer, U. S. Weather Bureau	Port Huron	St. Clair	B. & E.	January to December.
John S. Caulkins, M. D	Thornville	Lapeer	B. & E.	January to December.
Prof. R. C. Kedzie	Agricultural College	Ingham	C.	January to December.
E. S. Pettijohn, M. D	Alma	Gratiot	C.	January to April.
J. H. Lancashire, M. D	Alma	Gratiot	C.	May to December.
William M. Force	Office State B'd of Health, Lansing	Ingham	C.	January to December.
Asaph Hall, Jr., Director Detroit Observatory	Ann Arbor	Washtenaw	S. C.	January to December.
J. H. Kellogg, M. D	Battle Creek	Calhoun	S. C.	January to December.
C. C. Tefft	Tecumseh	Lenawee	S. C.	Jan. to May, Sept. to Dec.
S. Alexander	Birmingham	Oakland	S. E.	January to December.
Norman B. Conger and B. S Pague, Local Forecast Officials, U. S. W. Bureau.	Detroit	Wayne	S. E.	January to December.

*The counties in each division are stated in Exhibit I, in the annual report for 1898 and preceding reports.

The article in this annual report relative to "Causes of Diseases," based upon weekly reports of sickness in Michigan, may well be studied in connection with this article, the main purpose of which is to serve as a basis for studies of the causes of diseases.

It is believed that there is nowhere else so complete a statement of the facts relating to meteorology of Michigan as is here presented, for any use for which such knowledge may be needed, now or hereafter.

TABLE II.—*Latitude and longitude, elevation above sea level, and the average temperature and average barometric pressure in 1900, at meterological stations in Michigan,—the names of the stations being arranged in order by latitude, highest first.*

Localities in order of latitude, those fartherest North, first.	Latitude North.	Longitude West from Greenwich.	Altitude (approximate) above sea level.—Feet.	Height of mercury in cistern of barometer above sea level.—Feet.	Average temperature 1900. Degrees Fahr.	Average atmospheric pressure, 1900. Inches of mercury corrected for temp.
Marquette	46°34′	87°24′	669.	....	....	....
Sault Ste. Marie	46°30′	84°21′	607.	....	....	....
Alpena	45°5′	83°3′	587.	....	....	....
Traverse City	44°45′	85°40′	598.	605.	46.49	29.325
Alma	43°42′	87°75′	784.	790.	48.88	....
Harrisville	43°40′	83°30′	616.	....	44.21	29.322
Grand Haven	43°5′	86°18′	590.	....	....	....
Port Huron	43°0′	82°26′	602.	....	....	....
Thornville	* 42°55′	* 83°10′	† 975.	† 980.	48.85	28.952
Agricultural College	42°44′	84°29′	820.	834.	48.25	29.086
Lansing, S. B. of H.	‡ 42°44′	‡ 84°33′	§ 900.	917.	48.50	29.083
Birmingham	42°30′	83°10′	¶ 752.	....	48.44	29.085
Detroit	42°20′	83°3′	585.	....	....	....
Battle Creek	42°20′	85°11′	800.	....	51.00	29.333
Ann Arbor	42°17′	83°44′	930.	936.	49.05	29.044
Tecumseh	* 42°1′	* 83°57′	835.	840.	....	....

* Estimated from lines on a map of Michigan, issued by the General Land Office, Department of the Interior, 1878. For stations having no reference mark, the latitude and longitude were stated by the observer on the meteorological reports received.

† Estimated from data in Tackabury's Atlas of the State of Michigan.

‡ The exact latitude and longitude of the astronomical post placed in the ground near the new Capitol at Lansing, by the U. S. Lake Survey in 1875, as determined by the observations then made, is 42° 43′ 53.11″ N. and 84° 33′ 19.68″ W.

§ Estimated from comparisons of the barometrical observations at Lansing, Port Huron, and Grand Haven for the four years, 1879-82.

¶ Estimated from data on "Railroad Profiles," pages 179-187, Annual Report of the State Board of Health for 1878.

NOTE.—Green's standard barometer was used at the above stations for the year 1900.

TABLE III.—*Average temperature by year and months, for the year 1900, and the average for the 23 years, 1877-99. These averages are for groups of several stations in Michigan.*

Years, etc.	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 23 yrs., '77-99	46.43	21.76	23.18	30.02	44.98	56.37	66.57	70.93	68.30	61.53	49.48	36.35	27.80
1900.................	48.19	26.83	19.38	25.11	46.95	58.95	66.93	71.53	74.40	65.70	57.73	36.36	28.37

TABLE IV.—*Average temperature by year and months, for the year 1900, and the average for the 21 years, 1879-99, at the office of the State Board of Health, State Capitol, Lansing, Michigan.*

Years, etc.	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 21 yrs., '79-99	47.44	22.56	23.83	31.48	46.64	58.25	68.31	72.11	68.87	61.87	50.06	36.88	28.38
1900............	48.50	27.12	20.36	25.47	48.07	60 18	67.11	71.05	74.31	65.00	57.71	37.02	28.62

TABLE V.—*Average temperature by year and months, for the year 1900, and the average for the 36 years, 1864-99, at the Agricultural College, Michigan.*

Years, etc.	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 36 yrs., '64-99	46.65	21.98	23.51	31.00	46.11	58.03	67.88	71.42	68.86	60.62	48.41	35.61	26.55
1900.................	48.25	26.39	18.83	24.89	48.43	60.01	67.59	70.73	74.05	65.31	57.12	35.94	29.69

Meteorological characteristics of the year 1900 in Michigan.—At the several meteorological stations, in different parts of the State, the average temperature for 1900 was 1.76° higher than the average for the preceding twenty-three years; the annual range of temperature was 16° less than in 1899, and 1° less than the annual range for the preceding twenty-three years; the average monthly range of temperature was 9° less than in 1899, and 5° less than the average for the preceding twenty-three years. The daily range of temperature was .01° greater than in 1899, and .18° greater than the average for the preceding twenty-one years. The average cloudiness was the same as in 1899, and two per cent less than the average for the preceding twenty-three years; the rainfall (rain and melted snow) was 2.49 greater than in 1899, and 4.02 inches less than the average for the preceding twenty-three years; the average atmospheric pressure was .006 of an inch less than in 1899, and .022 of an inch greater than the average for the preceding twenty-three years.

In Table VI, is given by year and months, a comparison of conditions in 1900, in Michigan, with those in 1899, and with the averages of periods of years. Naming the months in order of greatest difference, October, August, January, September, May, April, July, December, June, and November were months in which the average temperature in 1900 was higher than the average for the corresponding months in the preceding twenty-three years; March and February were months in which the average temperature in 1900 was lower than the average for corresponding months in the preceding twenty-three years.

TABLE VI.—*Statements of meteorological conditions in the year, and in each month of the year 1900, compared with the annual and monthly averages for 1899, and for several stated periods of years. These statements and averages are for* **groups of several stations in Michigan.**

Meteorological conditions.	1900 Compared with averages for previous years.		In 1900 more (+), or less (—), than in 1899.	Meteorological conditions.	1900 Compared with averages for previous years.		In 1900 more (+), or less (—), than in 1899.
	No. of years averaged, end'g with 1899.	More (+), or less (—), in 1900 than the average for previous years			No. of years averaged, end'g with 1899.	More (+), or less (—), in 1900 than the average for previous years	
YEAR 1900.				YEAR 1900.			
Av. temp	23	+1.76°	+1.05°	*Continued.*			
Range of temp.*	23	—1°	—16°	Cloudiness	23	—2 per ct.	=
Av. monthly range of temp.*	23	—5°	—9°	Rainfall	23	—4.02 in.	+2.49 in.
Av. daily range of temp.*	21	+.18°	+.01°	Atmospheric pressure	23	+.022 in.	—.006 in.
JANUARY.				FEBRUARY.			
Av. temp	23	+5.07°	+4.63°	Av. temp	23	—3.80°	+2.29°
Range of temp.*	23	—6°	—11°	Range of temp.*	23	+8°	—12°
Av. daily range of temp.*	21	—.91°	—.85°	Av. daily range of temp.*	21	+.84°	+.69°
Cloudiness	23	+7 per ct.	+15 per ct.	Cloudiness	23	—1 per ct.	+9 per ct.
Rainfall	23	—.91 in.	—.34 in.	Rainfall	23	+.62 in.	+.163 in.
Atmospheric pressure	23	—.041 in.	—.069 in.	Atmospheric pressure	23	—.067 in.	—.022 in.
MARCH.				APRIL.			
Av. temp	23	—4.91°	—1.78°	Av. temp	23	+1.97°	—2.22°
Range of temp.*	23	—18°	—18°	Range of temp.*	23	—10°	—21°
Av. daily range of temp.*	21	+.74°	+2.81°	Av. daily range of temp *	21	=	—.89°
Cloudiness	23	—3 per ct.	—18 per ct.	Cloudiness	23	—9 per ct.	—4 per ct.
Rainfall	23	—.34 in.	—1.15 in.	Rainfall	23	—.80 in.	+.39 in.
Atmospheric pressure	23	+.042 in.	+.115 in.	Atmospheric pressure	23	+.067 in.	+.027 in.
MAY.				JUNE.			
Av. temp	23	+2.58°	—.05°	Av. temp	23	+.36°	—2.20°
Range of temp.*	23	+2°	+2°	Range of temp.*	23	+2°	+4°
Av. daily range of temp.*	21	+1.05°	+1.18°	Av. daily range of temp.*	21	+.54°	—.83°
Cloudiness	23	+3 per ct.	+2 per ct.	Cloudiness	23	—.11 per ct.	=
Rainfall	23	—.53 in.	—.15 in.	Rainfall	23	—1.11 in.	—.44 in.
Atmospheric pressure	23	+.027 in.	—.046 in.	Atmospheric pressure	23	+.030 in.	—.065 in.

* By registering thermometers.

Comments on Table VI are printed on pages 4 and 5.

The low temperature for March and the small amount of rainfall for the year 1900 are especially noticeable.

TABLE VI.—CONTINUED.—*Meteorological conditions at stations in Michigan, in months, for the year 1900, compared with averages for corresponding months in preceding years.*

Meteorological conditions.	1900 Compared with averages for previous years. No. of years averaged, end'g with 1899.	1900 Compared with averages for previous years. More (+), or less (—), in 1900 than the average for previous years	In 1900 more (+), or less (—), than in 1899.	Meteorological conditions.	1900 Compared with averages for previous years. No. of years averaged, end'g with 1899.	1900 Compared with averages for previous years. More (+), or less (—), in 1900 than the average for previous years	In 1900 more (+), or less (—), than in 1899.
JULY.				AUGUST.			
Av. temp	23	+.60°	+.99°	Av. temp	23	+6.10°	+2.42°
Range of temp.*	23	—2°	—6°	Range of temp.*	23	—3°	—5°
Av. daily range of temp.*	21	—1°	—.32°	Av. daily range of temp.*	21	—.15°	—2.46°
Cloudiness	23	+4 per ct.	—3 per ct.	Cloudiness	23	—1 per ct.	+10 per ct.
Rainfall	23	+1.22 in.	+.88 in.	Rainfall	23	+.28 in.	+2.06 in.
Atmospheric pressure	23	+.011 in.	—.017 in.	Atmospheric pressure	23	+.051 in.	+.027 in.
SEPTEMBER.				OCTOBER.			
Av. temp	23	+4.17°	+7.19°	Av. temp	23	+8.25°	+4.45°
Range of temp.*	23	—7°	—23°	Range of temp.*	23	—1°	=
Av. daily range of temp.*	21	+.13°	+.41°	Av. daily range of temp.*	21	+2.99°	+1.30°
Cloudiness	23	—1 per ct.	—9 per ct.	Cloudiness	23	—11 per ct.	+2 per ct.
Rainfall	23	—.44 in.	—.42 in.	Rainfall	23	—.59 in.	—.34 in.
Atmospheric pressure	23	+.030 in.	+.007 in.	Atmospheric pressure	23	+.098 in.	—.025 in.
NOVEMBER.				DECEMBER.			
Av. temp	23	+.01°	—4.67°	Av. temp	23	+.57°	+1.54°
Range of temp.*	23	—9°	—6°	Range of temp.*	23	—8°	—15°
Av. daily range of temp.*	21	—1.10°	—.73°	Av. daily range of temp.*	21	—.97°	—21°
Cloudiness	23	—1 per ct.	=	Cloudiness	23	—3 per ct.	+2 per ct.
Rainfall	23	+.35 in.	+1.94 in.	Rainfall	23	—1.79 in.	—1.56 in.
Atmospheric pressure	23	+.001 in.	—.046 in.	Atmospheric pressure	23	+.010 in.	+.044 in.

* By registering thermometers.

Representative data.—Whoever will carefully study Diagram I, in this article, and in similar articles for preceding years, will see that thermometers and methods of observation have become so perfect that, given a curve representing correctly the temperature by months at one station in Michigan, curves can readily be constructed without actual records, which will somewhat closely represent the temperature at each of several other stations, because the curves for many stations run so nearly parallel that all that is necessary to do is to find the average difference of mean annual temperature at the station to be represented compared with the station for which the data are given. It may also be seen that a curve representing the temperature at a station in the Central part of the State very closely resembles the curve representing the average for many stations representing nearly all parts of the State. This proves that the practice adopted many years ago of stating the meteorological characteristics at one central station is a reasonably safe practice, and it is especially useful when it enables us to gain a comparison for a longer period than can be made from records at many stations, and also when employed in advance of the receipt of records from all stations, as is the case when the weekly bulletins of "Health in Michigan" are issued, for the purposes for which the meteorological conditions at the State Capitol are used to represent the conditions probably prevailing throughout the State.

That a curve exhibiting the results of the observations of *one* skillful observer, in the central part of the State, using an instrument of precision (a standard thermometer costing about three dollars), is substantially like a curve for the average of other localities, is a fact of very great importance in statistics; proving, as it does, that when great care is taken to ensure accuracy of observation, representative data are reasonably accurate and reliable; even the data collected by one observer may represent an entire State with sufficient accuracy for most practical purposes.

LOCAL METEOROLOGICAL PHENOMENA IN THE SEVERAL MONTHS OF THE YEAR 1900.

The following general remarks relative to temperature, frosts, effects on vegetation, migration of birds, etc., in 1900, are taken from the monthly reports by observers. The names of stations are appended; the names of observers are stated in Table I.

JANUARY.

Depth of snow on ground, Jan. 15, 10.6 inches; Jan. 31, 15.7 inches.—*Marquette.*

Did not freeze at night, Jan. 18, 19. January was an unusually warm month for the season except the last week which was severe winter. There is a lack of snow sufficient to protect the wheat well. The frost in the ground is not much, in the woods hardly anything. It was a windy month, especially so the first and last weeks.—*Thornville.*

Killing frosts, Jan. 1, 6, 8, 9, 21, 22, 23. Ground frozen Jan. 1-31.

Thunder shower, between 5:00 and 6:00 p. m. Jan. 24.

Depth of snow on ground, Jan. 15, 2 inches; Jan. 31, 1 inch.—*Lansing.*

FEBRUARY.

Grand Traverse Bay froze over on Jan. 17.—*Traverse City.*

February was a month of extremes of temperature, a range of 80 degrees,—from 60 above 0, to 20 below. It has been bad for wheat, not enough snow for protection. The prospect for a crop was poor when winter set in, on account of the ravages of the Hessian fly, and the lack of adequate covering has made it less. Ice on the ponds is thick, perhaps 16 inches, and frost in the ground must be deep. A bad storm the last day of the month—12 inches of light snow, roads badly blocked with it.—*Thornville.*

Ground froze Feb. 1-28. First sleighing of season. Feb. 4, 5, 6. Poor sleighing Feb. 15, 16, 17, 18, 22, 23, 24, 25, 26. Depth of snow on ground. Feb. 15, 3 inches; Feb. 28, 12 inches.—*Lansing.*

Heaviest snowfall for the month, 12.4 inches, Feb. 28.—*Detroit.*

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Heaviest snowfall for the month, 12.4 inches, Feb. 28.—*Detroit.*

MARCH.

Robins arrive, Mar. 30.—*Traverse City.*

Melting snow on ground, Mar. 13, 18, 19, 21, 22, 23, 24, 25, 28, 29, 30, 31.—*Conklin.*

Robins first seen, Mar. 20; bluebirds and blackbirds, Mar. 23. March was a month of severe winter with much snow which was thawing with its close, making a freshet of unusually high water.—*Thornville.*

Good sleighing, Mar. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10. Poor sleighing, Mar. 11, 12, 13, 14, 15, 16, 17, 18, 19, 20. Melting snow on ground Mar. 7-28. Crows appeared, Mar. 15. Robins, bluebirds and blackbirds appeared, Mar. 22. Main channel of Grand River opened, Mar. 25. Depth of snow on ground, Mar. 15, 6 inches; Mar. 31, none.—*Lansing.*

APRIL.

Local navigation opened, Apr. 21. General navigation opened, Apr. 23.—*Marquette.*

Ice went out of Grand Traverse Bay, Apr. 17. Martins arrive, Apr. 26.—*Traverse City.*

Light frosts, Apr. 1, 4, 7, 8, 16. Heavy frosts, Apr. 2, 3, 15, 25.—*Alpena.*

Killing frost, Apr. 11.—*Port Huron.*

Tamarack leafing, June-berry blossoming, Apr. 24. Dandelions blossoming, Apr. 28. Apple trees leafing, Apr. 30. Killdeer first seen, Apr. 4; meadow-lark and song sparrow, Apr. 6; barn swallows, 27; yellow-bird, Apr. 29. April was a cool, dry month, froze every night till Apr. 15, inclusive, except Apr. 6 and 7, not after. Except a slight frost, mornings of Apr. 25, 26, 27, 28, the month was favorable for work but not for growth. The outlook for wheat is very poor. The oats are not all sowed and none up yet, the season appearing to be quite backward. Except for peaches fruit prospects seem good enough.—*Thornville.*

Light frost Apr. 1.—*Detroit.*

Killing frosts, Apr. 1, 3, 4, 5, 10. Light frosts, Apr. 19, 20. Meadow-larks and killdeer appeared Apr. 1. Frogs heard Apr. 7. Ground froze, Apr. 4, 5, 9, 10, 11, 12, 13, 14. Commenced mowing Capitol lawn, Apr. 23. Dandelions in bloom, Apr. 28. Cherry trees in bloom, Apr. 30.—*Lansing.*

MAY.

Light frost, May 11. Heavy frost, May 10. Killing frosts, May 3, 4, 5, 6, 7, 9.—*Sault Ste. Marie.*

Frost, May 3.—*Traverse City.*

Heavy frost, May 10. Killing frost, May 5.—*Port Huron.*

Frosts, May 1, 4, 5, 9, 10, 18, 29. Pears, plums and sour cherries blossom, May 8. Apples blossom, May 14. Wheat heading, May 30. First bobolink seen, May 12. First cuckoo seen May 19. May was a good month for agricultural work—not very hot and plenty of rain. The prospect for a hay crop is excellent, and wheat has improved beyond expectation. As the month closes it is too wet to plant beans and potatoes or fit the ground for them, aside from plowing. Wheat is heading out, so the season is not late after all.—*Thornville.*

Killing frosts, May 3, 5. Ice formed, May 3, 5. Snow nearly covered ground, morning of May 4. Pear and plum trees in bloom, May 5. Red birds and orioles appeared, May 1. Bobolinks appeared, May 8.—*Lansing.*

Light snow flurry, May 4.—*Battle Creek.*

Light frost, May 10. Heavy frost, May 5.—*Detroit.*

JUNE.

Light frosts, June 3, 9.—*Marquette.*

Heavy frosts, June 9, 12.—*Sault Ste. Marie.*

Gale of wind followed by heavy thunderstorm; rainfall 1.35 inches in four hours; great damage from washouts to plowed fields and roads; several cattle and horses killed by lightning, June 13. Oats heading and some rye in shock, June 30. The mean temperature of June was low on account of the cool nights. This made the growth of corn unsatisfactory; as the month closes there is need of rain.—*Thornville.*

Light frosts reported, on low ground in country, morning of June 30.—*Lansing.*

JULY.

Wheat harvest began, July 9,—poorest crop ever raised in this part of Michigan. Very favorable for work—not much very hot weather and generally cool nights. As the month closes threshing has begun and oats harvest. Rye is a good crop, oats an immense one, and the prospect for corn, beans and potatoes good enough if we have timely rains to help them. Rain is needed now. In spite of the heavy rainfall of June and July, it is only the cultivated land that is moist; unplowed fields are dry.—*Thornville.*

Seismograph stopped, 3:20 P. M., July 23.—*Ann Arbor.*

Strange fall in the level of Lake Michigan.—The following extracts were taken from a report in the Alpena Evening Echo, of July 10, 1900, in regard to the disturbances in the water levels about the Lake Michigan shore:

"Saturday afternoon the water in Kenosha harbor,* without the slightest apparent cause and with no perceptible disturbance of the lake, suddenly fell more than four feet" * * *

"Ten minutes afterwards, in just as sudden and mysterious manner, the water flowed back into the harbor again and conditions at once became normal." * * *

"There was a very perceptible drop of about eighteen inches in the water level at the mouth of the Chicago river at 10 o'clock Saturday night." * * *

"A report from Muskegon, Michigan, tells of similar conditions at that point." * * *

"Well-informed lake sailors unite in stating that the phenomenon was not at all in the nature of a tidal wave. 'The present peculiar fluctuations in lake levels,' said a lake level expert, 'are no doubt brought about by squalls outside caused by thunderstorms and electrical disturbances. The sudden and varying winds drive the water away from the entrance and off the shore, and there is immediately a drop from one to two feet. If there has been a drop of four feet at Kenosha it is because the water there is shallow, and the effect of the wind or a squall is more marked, just as you notice it on the beach where there is little depth on the approach to shore.' " * * *

AUGUST.

Katydids first heard, Aug. 1. Severe thunderstorm, much damage, barn burnt, several horses killed, Aug. 19. A hot month. The long hot term was tempered most of the time by stiff breeze that made it quite tolerable.—*Thornville.*

SEPTEMBER.

Light frost, Sept. 18.—*Marquette.*

Light frosts, Sept. 18, 27.—*Sault Ste. Marie.*

Light frost, Sept. 18. Heavy frost, Sept. 28.—*Alpena.*

Light frosts, Sept. 18, 28, (in vicinity).—*Port Huron.*

Frost, killing in low places, first of season, Sept. 18. September was dry and hot. Potatoes have remained green till the close and very late planted beans ripened. Corn has ripened perfectly sound. The season would have been good for wheat newly sowed if there had been some frosts.—*Thornville.*

Light frost, first of season, Sept. 18.—*Lansing.*

Light frost, Sept. 18.—*Detroit.*

OCTOBER.

Killing frosts, Oct. 17, 29.—*Marquette.*

Killing frost, Oct. 17.—*Sault Ste. Marie.*

Light frost, Oct. 14. Heavy frosts, Oct. 8, 10. Killing frost, Oct. 17. Warmest October on record at Alpena.—*Alpena.*

Heavy frosts, Oct. 11, 20.—*Port Huron.*

Light frosts, Oct. 9, 10, 11. Killing frosts, Oct. 17, 20. A warm month, very favorable for growth, but bad for the wheat which is badly ravaged by the Hessian fly.—*Thornville.*

Killing frosts, Oct. 10, 17. Light frosts, Oct. 11, 19, 20. Ground froze, morning of Oct. 17, first time of season.—*Lansing.*

Frosts, Oct. 17, 20.—*Ann Arbor.*

Light frosts, Oct. 10, 11, 18, 20. Heavy frost, Oct. 17.—*Detroit.*

NOVEMBER.

Light frost, Nov. 5. Heavy frosts, Nov. 2, 3. Killing frost, Nov. 6.—*Port Huron.*

Melting snow on ground, Nov. 17, 29. November was a rough, stormy month with some wintry weather. As the month closes there is not yet any frost in the ground. There was considerable snow that did not lie.—*Thornville.*

Light frosts, Nov. 2, 3, 5. Killing frosts, Nov. 6, 7, 8, 23. Ground froze, Nov. 8, 9, 10, 12, 13, 14, 15, 16, 17, 23, 24, 25, 26, 27, 28, 29, 30. Ice formed in Grand River, morning of Nov. 15, first time of season. Dandelions bloom Nov. 21. Depth of snow on ground, Nov. 15, 3 inches; Nov. 30, light in patches.—*Lansing.*

Light frost, Nov. 2. Heavy frost, Nov. 8.—*Detroit.*

DECEMBER.

Dryest December on record at Alpena.—*Alpena.*

Did not freeze at night, Dec. 3, 4, 18. December was a dry, warm (for the season) month. No sleighing, but very good wheeling. Ice is very thin yet, streams are not frozen over, not much frost in the ground—a very pleasant month.—*Thornville.*

Ground frozen, Dec. 8-31 inclusive. Grand River closed, first time of season, Dec. 12. Depth of snow on ground, Dec. 15, none; Dec. 31, 1½ inches.—*Lansing.*

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* Probably refers to Kenosha, Wisconsin, nearly west of Allegan county, Michigan.

MARCH.

Robins arrive, Mar. 30.—*Traverse City.*

Melting snow on ground, Mar. 13, 18, 19, 21, 22, 23, 24, 25, 28, 29, 30, 31.—*Conklin.*

Robins first seen, Mar. 20; bluebirds and blackbirds, Mar. 23. March was a month of severe winter with much snow which was thawing with its close, making a freshet of unusually high water.—*Thornville.*

Good sleighing, Mar. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10. Poor sleighing, Mar. 11, 12, 13, 14, 15, 16, 17, 18, 19, 20. Melting snow on ground Mar. 7-28. Crows appeared, Mar. 15. Robins, bluebirds and blackbirds appeared, Mar. 22. Main channel of Grand River opened, Mar. 25. Depth of snow on ground, Mar. 15, 6 inches; Mar. 31, none.—*Lansing.*

APRIL.

Local navigation opened, Apr. 21. General navigation opened, Apr. 23.—*Marquette.*

Ice went out of Grand Traverse Bay, Apr. 17. Martins arrive, Apr. 26.—*Traverse City.*

Light frosts, Apr. 1, 4, 7, 8, 16. Heavy frosts, Apr. 2, 3, 15, 25.—*Alpena.*

Killing frost, Apr. 11.—*Port Huron.*

Tamarack leafing, June-berry blossoming, Apr. 24. Dandelions blossoming, Apr. 28. Apple trees leafing, Apr. 30. Killdeer first seen, Apr. 4; meadow-lark and song sparrow, Apr. 6; barn swallows, 27; yellow-bird, Apr. 29. April was a cool, dry month, froze every night till Apr. 15, inclusive, except Apr. 6 and 7, not after. Except a slight frost, mornings of Apr. 25, 26, 27, 28, the month was favorable for work but not for growth. The outlook for wheat is very poor. The oats are not all sowed and none up yet, the season appearing to be quite backward. Except for peaches fruit prospects seem good enough.—*Thornville.*

Light frost Apr. 1.—*Detroit.*

Killing frosts, Apr. 1, 3, 4, 5, 10. Light frosts, Apr. 19, 20. Meadow-larks and killdeer appeared Apr. 1. Frogs heard Apr. 7. Ground froze, Apr. 4, 5, 9, 10, 11, 12, 13, 14. Commenced mowing Capitol lawn, Apr. 23. Dandelions in bloom, Apr. 28. Cherry trees in bloom, Apr. 30.—*Lansing.*

MAY.

Light frost, May 11. Heavy frost, May 10. Killing frosts, May 3, 4, 5, 6, 7, 9.—*Sault Ste. Marie.*

Frost, May 3.—*Traverse City.*

Heavy frost, May 10. Killing frost, May 5.—*Port Huron.*

Frosts, May 1, 4, 5, 9, 10, 18, 29. Pears, plums and sour cherries blossom, May 8. Apples blossom, May 14. Wheat heading, May 30. First bobolink seen, May 12. First cuckoo seen May 19. May was a good month for agricultural work—not very hot and plenty of rain. The prospect for a hay crop is excellent, and wheat has improved beyond expectation. As the month closes it is too wet to plant beans and potatoes or fit the ground for them, aside from plowing. Wheat is heading out, so the season is not late after all.—*Thornville.*

Killing frosts, May 3, 5. Ice formed, May 3, 5. Snow nearly covered ground, morning of May 4. Pear and plum trees in bloom, May 5. Red birds and orioles appeared, May 1. Bobolinks appeared, May 8.—*Lansing.*

Light snow flurry, May 4.—*Battle Creek.*

Light frost, May 10. Heavy frost, May 5.—*Detroit.*

JUNE.

Light frosts, June 3, 9.—*Marquette.*

Heavy frosts, June 9, 12.—*Sault Ste. Marie.*

Gale of wind followed by heavy thunderstorm; rainfall 1.35 inches in four hours; great damage from washouts to plowed fields and roads; several cattle and horses killed by lightning, June 13. Oats heading and some rye in shock, June 30. The mean temperature of June was low on account of the cool nights. This made the growth of corn unsatisfactory; as the month closes there is need of rain.—*Thornville.*

Light frosts reported, on low ground in country, morning of June 30.—*Lansing.*

JULY.

Wheat harvest began, July 9,—poorest crop ever raised in this part of Michigan. Very favorable for work—not much very hot weather and generally cool nights. As the month closes threshing has begun and oats harvest. Rye is a good crop, oats an immense one, and the prospect for corn, beans and potatoes good enough if we have timely rains to help them. Rain is needed now. In spite of the heavy rainfall of June and July, it is only the cultivated land that is moist; unplowed fields are dry.—*Thornville.*

Seismograph stopped, 3:20 P. M., July 23.—*Ann Arbor.*

Strange fall in the level of Lake Michigan.—The following extracts were taken from a report in the Alpena Evening Echo, of July 10, 1900, in regard to the disturbances in the water levels about the Lake Michigan shore:

"Saturday afternoon the water in Kenosha harbor,* without the slightest apparent cause and with no perceptible disturbance of the lake, suddenly fell more than four feet" * * *

"Ten minutes afterwards, in just as sudden and mysterious manner, the water flowed back into the harbor again and conditions at once became normal." * * *

"There was a very perceptible drop of about eighteen inches in the water level at the mouth of the Chicago river at 10 o'clock Saturday night." * * *

"A report from Muskegon, Michigan, tells of similar conditions at that point." * * *

"Well-informed lake sailors unite in stating that the phenomenon was not at all in the nature of a tidal wave. 'The present peculiar fluctuations in lake levels,' said a lake level expert, 'are no doubt brought about by squalls outside caused by thunderstorms and electrical disturbances. The sudden and varying winds drive the water away from the entrance and off the shore, and there is immediately a drop from one to two feet. If there has been a drop of four feet at Kenosha it is because the water there is shallow, and the effect of the wind or a squall is more marked, just as you notice it on the beach where there is little depth on the approach to shore.' " * * *

AUGUST.

Katydids first heard, Aug. 1. Severe thunderstorm, much damage, barn burnt, several horses killed, Aug. 19. A hot month. The long hot term was tempered most of the time by stiff breeze that made it quite tolerable.—*Thornville.*

SEPTEMBER.

Light frost, Sept. 18.—*Marquette.*

Light frosts, Sept. 18, 27.—*Sault Ste. Marie.*

Light frost, Sept. 18. Heavy frost, Sept. 28.—*Alpena.*

Light frosts, Sept. 18, 28, (in vicinity).—*Port Huron.*

Frost, killing in low places, first of season, Sept. 18. September was dry and hot. Potatoes have remained green till the close and very late planted beans ripened. Corn has ripened perfectly sound. The season would have been good for wheat newly sowed if there had been some frosts.—*Thornville.*

Light frost, first of season, Sept. 18.—*Lansing.*

Light frost, Sept. 18.—*Detroit.*

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NOVEMBER.

Light frost. Nov. 5. Heavy frosts, Nov. 2, 3. Killing frost, Nov. 6.—*Port Huron.*

Melting snow on ground, Nov. 17, 29. November was a rough, stormy month with some wintry weather. As the month closes there is not yet any frost in the ground. There was considerable snow that did not lie.—*Thornville.*

Light frosts, Nov. 2, 3, 5. Killing frosts, Nov. 6, 7, 8, 23. Ground froze, Nov. 8, 9, 10, 12, 13, 14, 15, 16, 17, 23, 24, 25, 26, 27, 28, 29, 30. Ice formed in Grand River, morning of Nov. 15, first time of season. Dandelions bloom Nov. 21. Depth of snow on ground, Nov. 15, 3 inches; Nov. 30, light in patches.—*Lansing.*

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DECEMBER.

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Ground frozen, Dec. 8-31 inclusive. Grand River closed, first time of season, Dec. 12. Depth of snow on ground, Dec. 15, none; Dec. 31, 1½ inches.—*Lansing.*

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* Probably refers to Kenosha, Wisconsin, nearly west of Allegan county, Michigan.

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Robins arrive, Mar. 30.—*Traverse City.*

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Robins first seen, Mar. 20; bluebirds and blackbirds, Mar. 23. March was a month of severe winter with much snow which was thawing with its close, making a freshet of unusually high water.—*Thornville.*

Good sleighing, Mar. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10. Poor sleighing, Mar. 11, 12, 13, 14, 15, 16, 17, 18, 19, 20. Melting snow on ground Mar. 7-28. Crows appeared, Mar. 15. Robins, bluebirds and blackbirds appeared, Mar. 22. Main channel of Grand River opened, Mar. 25. Depth of snow on ground, Mar. 15, 6 inches; Mar. 31, none.—*Lansing.*

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Light frost, May 11. Heavy frost, May 10. Killing frosts, May 3, 4, 5, 6, 7, 9.—*Sault Ste. Marie.*

Frost, May 3.—*Traverse City.*

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Frosts, May 1, 4, 5, 9, 10, 18, 29. Pears, plums and sour cherries blossom, May 8. Apples blossom, May 14. Wheat heading, May 30. First bobolink seen, May 12. First cuckoo seen May 19. May was a good month for agricultural work—not very hot and plenty of rain. The prospect for a hay crop is excellent, and wheat has improved beyond expectation. As the month closes it is too wet to plant beans and potatoes or fit the ground for them, aside from plowing. Wheat is heading out, so the season is not late after all.—*Thornville.*

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Frost, killing in low places, first of season, Sept. 18. September was dry and hot. Potatoes have remained green till the close and very late planted beans ripened. Corn has ripened perfectly sound. The season would have been good for wheat newly sowed if there had been some frosts.—*Thornville.*

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NOVEMBER.

Light frost, Nov. 5. Heavy frosts, Nov. 2, 3. Killing frost, Nov. 6.—*Port Huron.*

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Ground frozen, Dec. 8-31 inclusive. Grand River closed, first time of season, Dec. 12. Depth of snow on ground, Dec. 15, none; Dec. 31, 1½ inches.—*Lansing.*

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* Probably refers to Kenosha, Wisconsin, nearly west of Allegan county, Michigan.

TABLE VII.—*Depth of wells; depth of ground above water in well; temperature of water in well, and day of observation of such temperature, in each month of the year 1900, as reported by meteorological observers for the State Board of Health, and for the United States Weather Bureau. (The small figures above and at the right of the numbers denoting the degrees of temperature, state the day of the month on which the observation was made.)*

Stations in Michigan.	January.			February.			March.			April.			May.			June.		
	Depth of well. —Ft., in.	Depth of ground above water in well. —Ft., in.	Temp. of water in well.—Deg. Fahr.	Depth of well. —Ft., in.	Depth of ground above water in well. —Ft., in.	Temp. of water in well.—Deg. Fahr.	Depth of well. —Ft., in.	Depth of ground above water in well. —Ft., in.	Temp. of water in well.—Deg. Fahr.	Depth of well. —Ft., in.	Depth of ground above water in well. —Ft., in.	Temp. of water in well.—Deg. Fahr.	Depth of well. —Ft., in.	Depth of ground above water in well. —Ft., in.	Temp. of water in well.—Deg. Fahr.	Depth of well. —Ft., in.	Depth of ground above water in well. —Ft., in.	Temp. of water in well.—Deg. Fahr.
Traverse City *.............	55	41	48^{18}	....	....	.....	55	40 10½	46^{29}	....	....	......	55	40 3	47^{26}	55	40	47^{30}
Lansing....................	†	....	......	†	....	......	26 11½	26 9	48^{16}	†	....	......	†	....	......	26 11½	26 5½	50^{15}
Ann Arbor.................	14 10	11 4	44^{15}	14 10	10 6	42^{18}	14 10	11	40^{17}	14 10	9 10	44^{15}	14 10	10 1½	48^{17}	14 10	8 11¾	49^{15}

Stations in Michigan.	July.			August.			September.			October.			November.			December.		
	Depth of well. —Ft., in.	Depth of ground above water in well. —Ft., in.	Temp. of water in well.—Deg. Fahr.	Depth of well. —Ft., in.	Depth of ground above water in well. —Ft., in.	Temp. of water in well.—Deg. Fahr.	Depth of well. —Ft., in.	Depth of ground above water in well. —Ft., in.	Temp. of water in well.—Deg. Fahr.	Depth of well. —Ft., in.	Depth of ground above water in well. —Ft., in.	Temp. of water in well.—Deg. Fahr.	Depth of well. —Ft., in.	Depth of ground above water in well. —Ft., in.	Temp. of water in well.—Deg. Fahr.	Depth of well. —Ft., in.	Depth of ground above water in well. —Ft., in.	Temp. of water in well.—Deg. Fahr.
Traverse City *.............	55	39 8½	48^{30}	55	39 6	48^{31}	....	....	......	55	40 2	48^{29}	55	40 3½	48^{19}	55	39 8½	47^{20}
Lansing....................	26 11½	26 7	51^{16}	26 11½	26 7½	53^{25}	26 11½	26 8	53^{15}	†	....	......	†	....	......	†	....	......
Ann Arbor.................	14 10	9 7	53^{20}	14 10	10 3	57^{20}	14 10	10 11	54^{18}	17	13 3	55^{18}	14 10	12	52^{18}	17	13 7	47^{16}

* At Northern Michigan Asylum, Alfred Newman, observer.

† Well dry,—severe drought.

NOTE.—The small figures above and at the right of the numbers denoting the degrees of temperature, state the day of the month on which the observation was made.

Temperature of the atmosphere.—The average temperature by months, for the twenty-one years, 1879-99, at Lansing, and a comparison of 1900, by months, with that average, are stated in Table XI.

The average temperatures at each of ten stations in Michigan, and the average for nine stations in 1900, and in each month of that year, are stated in Table IX.

TABLE VIII.—*Average temperature by year and months in 1900, compared with annual and monthly averages for 1899, and for the 23 years, 1877-99.* These averages are for groups of several stations in Michigan.*

Years, etc.	Average temperature—Degrees Fahr.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 23 years, 1877-99	46.43	21.76	23.18	30.02	44.98	56.37	66.57	70.93	68.30	61.53	49.48	36.35	27.80
Av. 21 years, 1879-99	46.19	21.53	22.43	29.67	44.55	56.35	66.59	70.69	68.07	61.30	49.29	36.19	27.62
1899 (9 stations).....	47.14	22.20	17.09	26.89	49.17	59.00	69.13	70.54	71.98	58.51	53.28	41.03	26.83
1900 (9 stations).....	48.19	26.83	19.38	25.11	46.95	58.95	66.93	71.53	74.40	65.70	57.73	36.36	28.37
In 1900 **higher** than av. for 23 years, 1877-99..........	1.76	5.07	......	......	1.97	2.58	.36	.60	6.10	4.17	8.25	.01	.57
In 1900 **lower** than av. for 23 years 1877-99.....	....	......	3.80	4.91	......	......	......	......	......	......	......	......	......
In 1900 **higher** than in 1899.........	1.05	4.63	2.29	......	......	......	......	.99	2.42	7.19	4.45	......	1.54
In 1900 **lower** than in 1899.............	....	......	......	1.78	2.22	.05	2.20	......	......	......	......	4.67	......

* At from 9 to 22 stations per year for the 23 years, 1877-99. Just which stations in each year, up to 1897, are shown on page 17, report for 1898.

NOTE.—Beginning with the year 1885, allowance must be made for Lansing in Table VIII, because of a change in location of the instruments. The amount of the variation by months is shown in Exhibit A, on page 22, report for 1886.

The average annual and monthly temperatures at from 9 to 22 stations for a period of twenty-three years, 1877-99, are stated in Table VIII, in which is also given, by months, a comparison of 1900 with the average for 1899, and with the averages for the twenty-three years, 1877-99. By Table VIII, which gives averages for groups of several stations in Michigan, it appears that in 1900 the mean temperature in March, April, May, June and November was lower than in those months in 1899. It also appears that January, April, May, June, July, August, September, October, November and December were warmer than the average temperature for the corresponding months for the twenty-three years, 1877-99.

TABLE IX.—*Average temperature in degrees Fahr., for the year, and by months of the year 1900, at each of 10 stations in Michigan, and also an average line for 9 stations. From observations made daily at 7 A. M., 2 P. M. and 9 P. M., local time, by observers* for the State Board of Health.*

Stations in Michigan.*	Divisions of the State. †	Temperature in degrees Fahr.													
		Year.		Months,‡ 1900.											
		Norm. §	1900.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oc'.	Nov.	Dec.
Average, 9 stations¶..	....	.....	48.19	26.83	19.38	25.11	46.95	58.95	66.93	71.53	74.40	65.70	57.73	36.36	28.37
Traverse City.........	N. W.	44.60^{18}	46.49	26.48	18.57	[a] 23.81	44.54	[f] 53.76	63.71	67.40	73.94	64.00	[a] 57.46	36.48	27.74
Harrisville............	N. E.	43.11^{12}	44.21	23.84	16.64	22.44	41.46	51.24	60.29	66.61	66.38	63.74	56.06	35.82	25.97
Thornville.......	B. & E.	48.00^{24}	48.85	27.62	19.26	24.60	48.82	60.12	67.60	71.61	75.12	65.60	58.19	38.37	29.23
Alma..................	C.	48.93^{3}	48.88	25.54	18.24	25.88	50.10	61.69	70.67	78.78	77.42	67.17	[a] 56.41	28.64	26.03
Agr'l College.........	C.	46.69^{37}	48.25	26.39	18.83	24.89	48.43	60.01	67.59	70.73	74.05	65.31	57.12	35.94	29.69
Lansing, S. B. of H.||.	C.	47.49^{22}	48.50	27.12	20.36	25.47	48.07	60.18	67.11	71.05	74.31	65.00	57.71	37.02	28.62
Ann Arbor............	S. C.	47.27^{20}	49.05	27.50	20.40	25.90	48.20	60.10	67.50	72.30	75.10	66.50	58.30	37.90	28.90
Battle Creek..........	S. C.	......	51.00	28.91	22.14	27.78	50.77	63.74	[b] 69.90	72.99	77.46	67.84	60.50	39.23	30.71
Tecumseh.	S. C.	......	**	27 06	21.37	26.28	48.54	59.62	.....	.....	.....	66.00	57.03	37.76	28.96
Birmingham	S. E.	48.08^{14}	48.44	[d] 28.08	19.96	[c] 25.18	42.12	[c] 59.70	[e] 67.96	[a] 72.32	[a] 75.81	[b] 66.10	[a] 57.78	[c] 37.86	[d] 28.44

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* The names of observers, their place of observation, and the counties in which these places are situated, are stated in Table I.

† The names of divisions, and the counties in each, are stated in Exhibit I, in the annual report for 1898 and preceding reports.

‡ The computations for average temperature, as tabulated for months in 1900, were made at the following stations: Ann Arbor and the Agricultural College. All other computations in Table IX were made at the office of the State Board of Health.

§ Numbers in this column state the average annual temperature for periods of years ending in each case with December 31, 1900. The small figures above and at the right of numbers which state the temperature, denote the number of years included in the average.

¶ This line is an average for only the nine stations from which statements nearly complete were received for every month of the year. It does not include Tecumseh.

||Beginning with the year 1885, allowance must be made for Lansing in Table IX, because of a change in the location of the instruments. The amount of the variation by months is shown in Exhibit A, on page 22, report for 1886.

** The average for 9 months is 41.40.

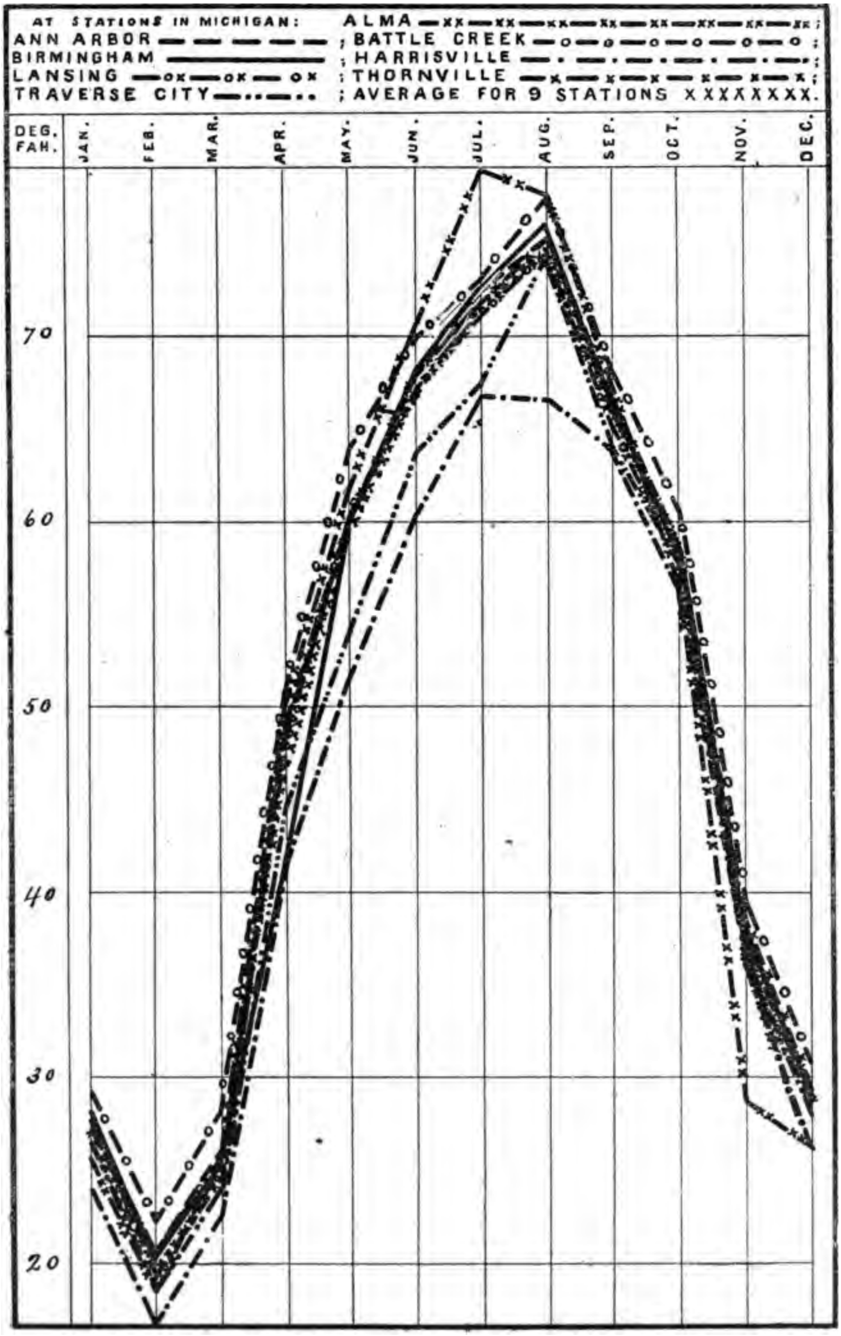
a, b, c. In the columns from January to December, inclusive, the letters a, b, c, etc., stand directly above the numbers from which they refer to the notes below.

a For 30 days. b For 29 days. c For 28 days. d For 27 days. e For 26 days. f For 18 days.

The average line and lines for eight representative stations in Table IX are graphically represented in Diagram I.

The average daily range of temperature at from 6 to 19 stations per year, by months, for a period of twenty-one years, 1879-99, and a comparison of 1900 with the monthly averages for that period and for 1899, are given in Table XIII. The highest and lowest temperatures in every month in 1900, at each of fifteen stations, are stated in Table XIV. The average daily range of temperature by months in 1900, at each of fifteen stations, and the average for fourteen of the stations, are stated in Table XV. The lines for each of ten of these stations, and the average line for fourteen of the stations, are represented in Diagram II. It will be noticed that the greatest *average* daily range of the fourteen stations occurred during the months of May and June; but there were wide differences in the several stations.

DIAGRAM I.—AVERAGE TEMPERATURE BY MONTHS, 1900.



[PLATE 1073]

TABLE X.—*Comparison of the average temperature during the year and during each month of the year 1900, with the annual and with the monthly averages for the year 1899, and with the averages for the 36 years, 1864-99. Observations made by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Mich.*

Years, etc.	Average temperature—Degrees Fahr.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 36 years, 1864-99.	46.65	21.98	23.51	31.00	46.11	58.03	67.88	71.42	68.86	60.62	48.41	35.61	26.55
1899................	47.77	21.80	16.20	27.32	51.40	59.77	70.20	70.70	76.56	58.60	54.10	40.04	26.49
1900................	48.25	26.39	18.83	24.89	44.43	60.01	67.59	70.73	74.05	65.31	57.12	35.94	29.69
In 1900 **higher** than av. for 36 years, 1864-99............	1.60	4.41	......	......	......	1.98	......	......	5.19	4.69	8.71	.33	3.14
In 1900 **lower** than av. for 36 years, 1864-99............	......	......	4.68	6.11	1.68	......	.29	.69	......	......	......	......	......
In 1900 **higher** than in 1899............	.48	4.59	2.63	......	......	.24	......	.03	......	6.71	3.02	......	3.20
In 1900 **lower** than in 1899............	......	......	......	2.43	6.97	......	2.61	......	2.51	.....	......	4.10	......

TABLE XI.—*Average temperature by year and months in 1900*[*] *compared with annual and monthly averages for 1899, and for the 21 years, 1879-99. Observations made at office State Board of Health, State Capitol, Lansing, Mich.*

Years, etc.	Average temperature.—Degrees Fahr.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 21 years, 1879-99	47.44	22.56	23.83	31.48	46.64	58.25	68.31	72.11	68.87	61.87	50.06	36.88	28.38
1899................	48.09	23.03	18.14	27.73	51.24	60.49	70.39	71.80	72.27	59.01	54.31	41.09	27.56
1900................	48.50	27.12	20.36	25.47	48 07	60.18	67.11	71.05	74.31	65.00	57.71	37.02	28.62
In 1900 **higher** than av. for 21 years, 1879-99............	1.06	4.56	......	......	1.43	1.93	......	......	5.44	3.13	7.65	.14	.24
In 1900 **lower** than av. for 21 years, 1879-99............	......	......	3.47	6.01	......	......	1.20	1.06	......	......	......	......	......
In 1900 **higher** than in 1899............	.41	4.09	2.22	......	......	......	......	......	2.04	5.99	3.40	......	1.06
In 1900 **lower** than in 1899............	......	......	......	2.26	3.17	.31	3.28	.75	......	......	......	4 07	......

[*] Beginning with the year 1885, slight allowance should be made for Lansing in Exhibit 10, because of a change in the location of the instruments. The amount of the variation by months is shown in Exhibit A, on page 22, report for 1886.

Temperature of the atmosphere.—The average temperature by months, for the twenty-one years, 1879-99, at Lansing, and a comparison of 1900, by months, with that average, are stated in Table XI.

The average temperatures at each of ten stations in Michigan, and the average for nine stations in 1900, and in each month of that year, are stated in Table IX.

TABLE VIII.—*Average temperature by year and months in 1900, compared with annual and monthly averages for 1899, and for the 23 years, 1877-99.* These averages are for groups of several stations in Michigan.*

Years, etc.	Average temperature—Degrees Fahr.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 23 years, 1877-99	46.43	21.76	23.18	30.02	44.98	56.37	66.57	70.93	68.30	61.53	49.48	36.35	27.80
Av. 21 years, 1879-99	46.19	21.53	22.43	29.67	44.55	56.35	66.59	70.69	68.07	61.30	49.29	36.19	27.62
1899 (9 stations).....	47.14	22.20	17.09	26.89	49.17	59.00	69.13	70.54	71.98	58.51	53.28	41.03	26.83
1900 (9 stations).....	48.19	26.83	19.38	25.11	46.95	58.95	66.93	71.53	74.40	65.70	57.73	36.36	28.37
In 1900 **higher** than av. for 23 years, 1877-99............	1.76	5.07	......	......	1.97	2.58	.36	.60	6.10	4.17	8.25	.01	.57
In 1900 **lower** than av. for 23 years 1877-99.....	....	......	3.80	4.91	......	......	......	......	......	......	......	......	......
In 1900 **higher** than in 1899........	1.05	4.63	2.29	......	......	......	......	.99	2.42	7.19	4.45	......	1.54
In 1900 **lower** than in 1899.............	....	......	......	1.78	2.22	.05	2.20	......	......	......	......	4.67	......

* At from 9 to 22 stations per year for the 23 years, 1877-99. Just which stations in each year, up to 1897, are shown on page 17, report for 1898.

NOTE.—Beginning with the year 1885, allowance must be made for Lans'ng in Table VIII, because of a change in location of the instruments. The amount of the variation by months is shown in Exhibit A, on page 22, report for 1886.

The average annual and monthly temperatures at from 9 to 22 stations for a period of twenty-three years, 1877-99, are stated in Table VIII, in which is also given, by months, a comparison of 1900 with the average for 1899, and with the averages for the twenty-three years, 1877-99. By Table VIII, which gives averages for groups of several stations in Michigan, it appears that in 1900 the mean temperature in March, April, May, June and November was lower than in those months in 1899. It also appears that January, April, May, June, July, August, September, October, November and December were warmer than the average temperature for the corresponding months for the twenty-three years, 1877-99.

TABLE IX.—*Average temperature in degrees Fahr., for the year, and by months of the year 1900, at each of 10 stations in Michigan, and also an average line for 9 stations. From observations made daily at 7 A. M., 2 P. M. and 9 P. M., local time, by observers* for the State Board of Health.*

Stations in Michigan.*	Divisions of the State. †	Temperature in degrees Fahr.													
		Year.		Months,‡ 1900.											
		Norm. §	1900.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Average, 9 stations¶..	....	.....	48.19	26.83	19.38	25.11	46.95	58.95	66.93	71.53	74.40	65.70	57.73	36.36	28.37
Traverse City.........	N. W.	44.60^{18}	46.49	26.48	18.57	^{a}23.81	44.54	^{f}53.76	63.71	67.40	73.94	64.00	^{a}57.46	36.48	27.74
Harrisville............	N. E.	43.11^{12}	44.21	23.84	16.64	22.44	41.46	51.24	60.29	66.61	66.38	63.74	56.06	35.82	25.97
Thornville.......	B. & E.	48.00^{24}	48.85	27.62	19.26	24.60	48.82	60.12	67.60	71.61	75.12	65.60	58.19	38.37	29.23
Alma..................	C.	48.93^{3}	48.88	25.54	18.24	25.88	50.10	61.69	70.67	78.78	77.42	67.17	^{a}56.41	28.64	26.03
Agr'l College.........	C.	46.69^{37}	48.25	26.39	18.83	24.89	48.43	60.01	67.59	70.73	74.05	65.31	57.12	35.94	29.69
Lansing, S. B. of H.‖.	C.	47.43^{22}	48.50	27.1[illegible]	20.36	25.47	48.07	60.18	67.11	71.05	74.31	65.00	57.71	37.02	28.62
Ann Arbor............	S. C.	47.27^{20}	49.05	27.50	20.40	25.90	48.20	60.10	67.50	72.30	75.10	66.50	58.30	37.90	28.90
Battle Creek.........	S. C.	......	51.00	28.91	22.14	27.78	50.77	63.74	^{b}69.90	72.99	77.46	67.84	60.50	39.23	30.71
Tecumseh.	S. C.	......	**	27 06	21.37	26.28	48.54	59.62	.....	.....	.....	66.00	57.03	37.76	28.96
Birmingham	S. E.	48.08^{14}	48.44	^{d}28.08	19.96	^{c}25.18	42.12	^{c}59.70	^{e}67.96	^{a}72.32	^{a}75.81	^{b}66.10	^{a}57.78	^{c}37.86	^{d}28.44

* The names of observers, their place of observation, and the counties in which these places are situated, are stated in Table I.

† The names of divisions, and the counties in each, are stated in Exhibit I, in the annual report for 1898 and preceding reports.

‡ The computations for average temperature, as tabulated for months in 1900, were made at the following stations: Ann Arbor and the Agricultural College. All other computations in Table IX were made at the office of the State Board of Health.

§ Numbers in this column state the average annual temperature for periods of years ending in each case with December 31, 1900. The small figures above and at the right of numbers which state the temperature, denote the number of years included in the average.

¶ This line is an average for only the nine stations from which statements nearly complete were received for every month of the year. It does not include Tecumseh.

‖ Beginning with the year 1885, allowance must be made for Lansing in Table IX, because of a change in the location of the instruments. The amount of the variation by months is shown in Exhibit A, on page 22, report for 1886.

** The average for 9 months is 41.40.

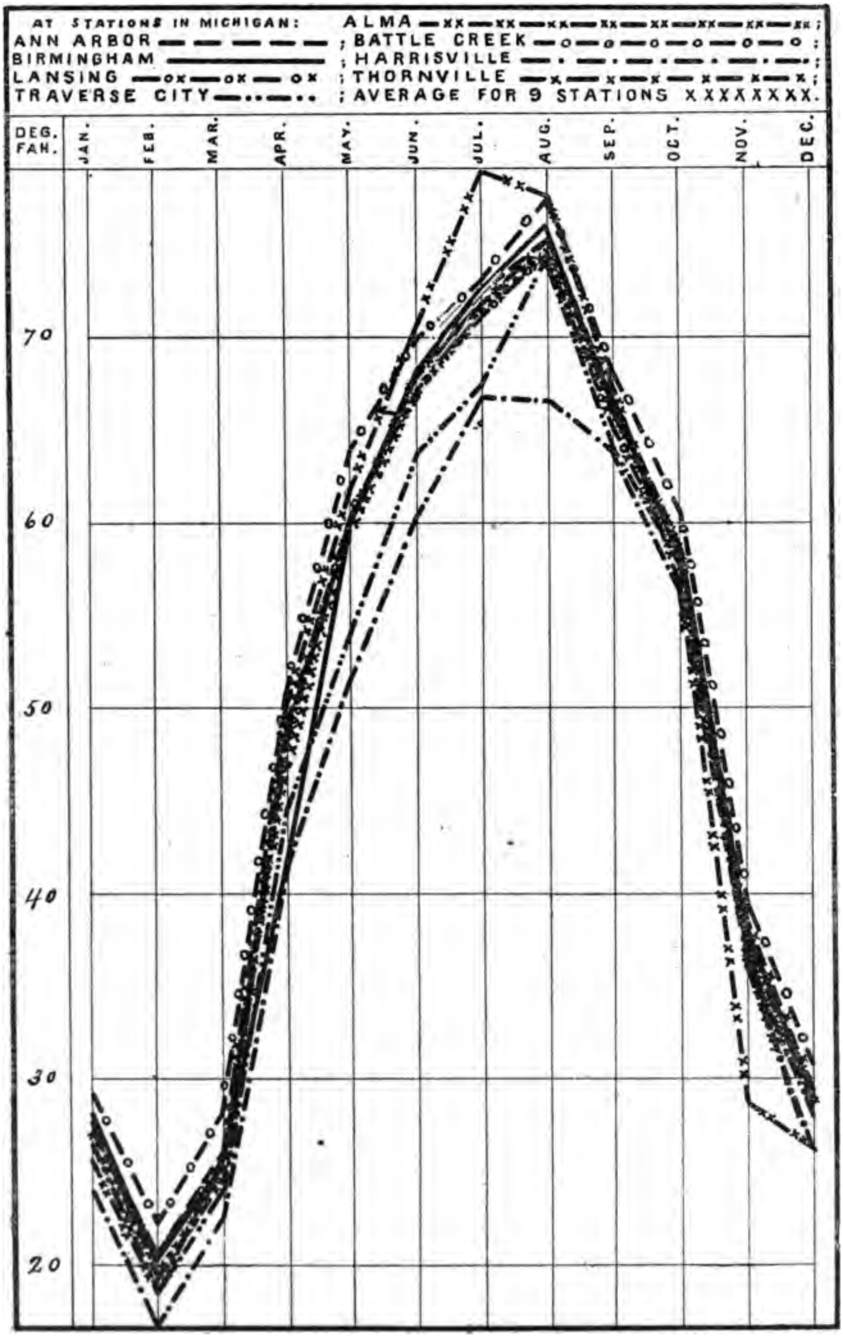
a, b, c. In the columns from January to December, inclusive, the letters a, b, c, etc., stand directly above the numbers from which they refer to the notes below.

a For 30 days. b For 29 days. c For 28 days. d For 27 days. e For 26 days. f For 18 days.

The average line and lines for eight representative stations in Table IX are graphically represented in Diagram I.

The average daily range of temperature at from 6 to 19 stations per year, by months, for a period of twenty-one years, 1879-99, and a comparison of 1900 with the monthly averages for that period and for 1899, are given in Table XIII. The highest and lowest temperatures in every month in 1900, at each of fifteen stations, are stated in Table XIV. The average daily range of temperature by months in 1900, at each of fifteen stations, and the average for fourteen of the stations, are stated in Table XV. The lines for each of ten of these stations, and the average line for fourteen of the stations, are represented in Diagram II. It will be noticed that the greatest *average* daily range of the fourteen stations occurred during the months of May and June; but there were wide differences in the several stations.

DIAGRAM I:—AVERAGE TEMPERATURE BY MONTHS, 1900.



[PLATE 1073]

TABLE X.—*Comparison of the average temperature during the year and during each month of the year 1900, with the annual and with the monthly averages for the year 1899, and with the averages for the 36 years, 1864-99. Observations made by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Mich.*

Years, etc.	Average temperature—Degrees Fahr.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 36 years, 1864-99.	46.65	21.98	23.51	31.00	46.11	58.03	67.88	71.42	68.86	60.62	48.41	35.61	26.55
1899................	47.77	21.80	16.20	27.32	51.40	59.77	70.20	70.70	76.56	58.60	54.10	40.04	26.49
1900................	48.25	26.39	18.83	24.89	44.43	60.01	67.59	70.73	74.05	65.31	57.12	35.94	29.69
In 1900 **higher** than av. for 36 years, 1864-99............	1.60	4.41	......	......	......	1.98	......	......	5.19	4.69	8.71	.33	3.14
In 1900 **lower** than av. for 36 years, 1864-99............	....	......	4.68	6.11	1.68	......	.29	.69	......	......	......	......	......
In 1900 **higher** than in 1899............	.48	4.59	2.63	......	......	.24	......	.03	......	6.71	3.02	......	3.20
In 1900 **lower** than in 1899............	....	......	......	2.43	6.97	......	2.61	......	2.51	......	......	4.10	......

TABLE XI.—*Average temperature by year and months in 1900* compared with annual and monthly averages for 1899, and for the 21 years, 1879-99. Observations made at office State Board of Health, State Capitol, Lansing, Mich.*

Years, etc.	Average temperature.—Degrees Fahr.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 21 years, 1879-99	47.44	22.56	23.83	31.48	46.64	58.25	68.31	72.11	68.87	61.87	50.06	36.88	28.38
1899................	48.09	23.03	18.14	27.73	51.24	60.49	70.39	71.80	72.27	59.01	54.31	41.09	27.56
1900................	48.50	27.12	20.36	25.47	48 07	60.18	67.11	71.05	74.31	65.00	57.71	37.02	28.62
In 1900 **higher** than av. for 21 years, 1879-99............	1.06	4.56	......	......	1.43	1.93	......	......	5.44	3.13	7.65	.14	.24
In 1900 **lower** than av. for 21 years, 1879-99............	....	......	3.47	6.01	......	......	1.20	1.06	......	......	......	......	......
In 1900 **higher** than in 1899............	.41	4.09	2.22	......	......	......	......	......	2.04	5.99	3.40	......	1.06
In 1900 **lower** than in 1899............	....	......	......	2.26	3.17	.31	3.28	.75	......	......	......	4 07	......

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* Beginning with the year 1885, slight allowance should be made for Lansing in Exhibit 10, because of a change in the location of the instruments. The amount of the variation by months is shown in Exhibit A, on page 22, report for 1886.

TABLE XII.—*Average temperature in degrees Fahr., for the year and months, 1900, at office State Board of Health, State Capitol, Lansing, Michigan, computed from readings at 7 A. M., 2 P. M. and 9 P. M., daily, from registers of the Draper self-recording thermometer, compared with observations made with Green's standard mercurial thermometer at the same hours; both thermometers placed in double latticed shelter for instruments, in the southwest part of the Capitol yard.*

Tri-daily readings of instruments specified.	Year.	Average temperature, in degrees Fahr.—Year and months, 1900.											
		Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. temp. from tri-daily observations with Green's standard mercurial thermometer	48.19	26.83	19.38	25.11	46.95	58.95	66.93	71.53	74.40	65.70	57.73	36.36	28.37
Av. temp. computed from readings of the Draper's self-recording thermometer..................	47.62	27.12	20.40	25.91	47.47	58.63	65.24	68.76	72.02	63.45	56.43	36.83	29.19
Higher by Draper's than by Green's thermometer	......	.29	1.02	.80	.52	......	......	......	......	......	......	.47	.82
Lower by Draper's than by Green's thermometer..	.57	......	......	......	......	.32	1.69	2.77	2.38	2.25	1.30	......	......

TABLE XIII.—*Average daily range of temperature, by year and months, in 1900, compared with annual and monthly averages for 1899, and for the 21 years, 1879-99.* These averages are for groups of several stations in Michigan.*

Years, etc.	Average daily range of temperature—Degrees Fahr.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept	Oct.	Nov.	Dec.
Av. 21 years, 1879-99*	17.99	15.34	16.78	17.23	19.12	20.26	20.82	21.07	20.54	20.17	17.33	14.11	13.12
1899 (15 stations)....	18.16	15.28	16.93	15.16	20.01	20.13	22.19	20.39	22.85	19.89	19.02	13.74	12.36
1900 (14 stations)....	18.17	14.43	17.62	17.97	19.12	21.31	21.36	20.07	20.39	20.30	20.32	13.01	12.15
In 1900 greater than av. for 21 years, 1879-99.....	.18	......	.84	.74	0	1.05	.54	......	.....	.13	2.99	......	......
In 1900 less than av. for 21 years, 1879-99............	....	.91	......	......	......	......	......	1.00	.15	......	......	1.10	.97
In 1900 greater than in 1899	.01	......	.69	2.81	......	1.18	......	......	......	.41	1.30	......	......
In 1900 less than in 1899...............	....	.85	......	......	.89	......	.83	.32	2.46	......	.....	.73	.21

* At from 6 to 19 stations per year for the 21 years, 1879-99. Just which stations in each year, up to 1897, are shown on page 21, report for 1898.

TABLE XVI.—*Comparisons of the extremes and the range of temperature (degrees Fahr.) during the year, and during each month of the year 1900, with the average of the extremes, and of the range, for the 23 years, 1877-99, also statement of the extremes and of the range for each of the seven years, 1894-1900. Observations made with registering thermometers by observers for the State Board of Health, and for the U. S. Weather Bureau. These comparisons, etc., are for* **groups of several stations in Michigan.**

Year and months	Extremes and ranges of temperature—Degrees Fahrenheit.																										
	1894.			1895.			1896.			1897.			1898.			1899.			Av. for 23 years, 1877-99.			1900.*			1900 higher (+) or lower (—) than av. 23 years, 1877-99.		
	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.
Year..	102	-26	128	100	-28	128	98	-25	123	102	-21	123	100	-18	118	104	-37	141	100	-26	126	103	-22	125	+3	+4	-1
Av. mo	81	10	71	80	9	71	78	9	69	78	10	68	79	13	66	83	10	73	79	10	69	79	15	64	=	+5	-5
Jan...	57	-18	75	50	-12	62	45	-25	70	58	-19	77	58	-10	68	51	-28	79	54	-20	74	54	-14	68	=	+6	-6
Feb ...	54	-26	80	54	-28	82	59	-22	81	46	-21	67	57	-18	75	60	-37	97	55	-22	77	63	-22	85	+8	=	+8
March	79	-2	81	69	-16	85	69	-16	85	70	-14	84	70	-3	73	66	-13	79	66	-13	79	49	-12	61	-17	+1	-18
April..	88	12	76	82	17	65	87	7	80	79	5	74	78	8	70	91	5	86	83	8	75	83	18	65	=	+10	-10
May ...	94	30	64	98	26	72	98	33	65	84	22	62	83	29	54	93	27	66	90	24	66	92	24	68	+2	=	+2
June..	98	33	65	99	37	62	91	37	54	92	27	65	96	39	57	97	37	60	95	33	62	99	35	64	+4	+2	+2
July ..	102	37	65	100	38	62	95	39	56	102	46	56	99	37	62	104	42	62	98	40	58	98	42	56	=	+2	-2
Aug...	99	32	67	97	36	61	96	35	61	94	38	56	100	42	58	104	42	62	97	37	60	103	46	57	+6	+9	-3
Sept. .	99	29	70	98	28	70	88	22	66	98	28	70	98	32	66	103	21	82	94	28	66	95	36	59	+1	+8	-7
Oct. ..	80	20	60	80	10	70	77	15	62	91	25	66	89	16	73	85	21	64	84	19	65	89	25	64	+5	+6	-1
Nov ..	67	-7	74	72	-1	73	67	-3	70	65	-5	70	67	3	64	84	19	65	69	1	68	69	10	59	=	+9	-9
Dec ...	60	-19	79	63	-24	87	59	-16	75	57	-16	73	51	-17	68	59	-17	76	58	-11	69	54	-7	61	-4	+4	-8

* For the twenty-three years, 1877-99, the highest temperature was 105°, at Battle Creek, September 9, 1884; the lowest was -37°, at Sault Ste. Marie, February 10, 1899.

TABLE XVII.—*Average absolute humidity, by year and months in 1900, compared with annual and monthly averages for 1899, and for the 23 years, 1877-99.* These averages are for groups of several stations in Michigan.*

Years, etc.	Absolute humidity—Grains of vapor in a cubic foot of air.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 23 years, 1877-99	3.47	1.45	1.51	1.83	2.85	4.02	5.54	6.08	5.77	4.93	3.52	2.34	1.79
1899 (7 stations).....	3.54	1.40	1.22	1.53	3.28	4.40	5.68	6.09	5.89	4.58	3.95	2.72	1.69
1900 (6 stations).....	3.67	1.63	1.27	1.42	2.93	4.23	5.41	6.28	7.02	5.38	4.47	2.39	1.61
In 1900 greater than av. for 23 years, 1877-99.....	.20	.18	......	......	.08	.21	......	.20	1.25	.45	.95	.05	......
In 1900 less than av. for 23 years, 1877-99...........	......	......	.24	.41	......	......	.13	......	......	......	......	......	.18
In 1900 greater than in 1899......	.13	.23	.05	......	......	......	......	.19	1.13	.80	.52	......	......
In 1900 less than in 1899..............	......	......	......	.11	.35	.17	.27	......	......	......	......	.33	.08

* At from 6 to 23 stations per year for the 23 years, 1877-99. Just which stations in each year, up to 1897, are shown on page 27, report for 1898.

NOTE.—Beginning with the year 1885, allowance must be made for Lansing in Exhibit 15, because of a change in the location of the instruments. The amount of variation by months is shown in Exhibit C, on page 23, report for 1886.

TABLE XVIII.—*Average relative humidity, by years and months, in 1900, compared with annual and monthly averages for 1899, and for the 22 years, 1878-99.* These averages are for groups of several stations in Michigan.*

Years, etc.	Per cent of saturation—Relative humidity.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 22 years, 1878-99.	76	83	82	79	71	71	73	71	73	76	77	80	83
1899 (8 stations).....	77	81	79	82	72	74	71	75	70	76	79	80	82
1900 (7 stations).....	79	82	83	81	73	72	76	77	78	77	80	84	80
In 1900 greater than av. for 22 years, 1878-99.....	3	......	1	2	2	1	3	6	5	1	3	4	......
In 1900 less than av. for 22 years, 1878-99...........	......	1	......	......	......	......	......	......	......	......	......	......	3
In 1900 greater than in 1899......	2	1	4	......	1	......	5	2	8	1	1	4	......
In 1900 less than in 1899..............	......	......	......	1	......	2	......	......	......	......	......	......	2

* At from 7 to 22 stations per year for the 22 years, 1878-99. Just which stations in each year, up to 1897, are shown on page 28, report for 1898.

NOTE.—Beginning with the year 1885, allowance must be made for Lansing in Exhibit 16, because of a change in the location of instruments. The amount of the variation is shown in Exhibit D, on page 23, report for 1886.

TABLE XIX.—ABSOLUTE HUMIDITY.—*The average number of grains of vapor of water in a cubic foot of air for months and year 1900, at 9 stations in Michigan; also average line for 6 stations.—Average of observations made daily at 7 A. M., 2 P. M. and 9 P. M., by observers* for the State Board of Health.*

Stations in Michigan.*	Divisions of the State. †	Grains of vapor in a cubic foot of air.—(Absolute humidity.)‡													
		Year.		Months, 1900.											
		Norm. §	1900.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 6 stations¶	....	......	3.67	1.63	1.27	1.42	2.93	4.23	5.41	6.28	7.02	5.38	4.47	2.39	1.61
Traverse City.....	N. W.	3.41 ^{19}	3.66	1.81	1.47	a 1.60	2.87	g 3.80	5.01	6.01	7.00	5.46	a 4.60	2.42	1.81
Harrisville........	N. E.	3.12 ^{6}	3.37	1.28	1.03	1.16	2.71	3.66	4.69	5.81	6.84	5.49	4.35	2.13	1.32
Thornville........	B. & E.	3.66 ^{24}	3.81	1.95	1.50	a 1.65	3.23	4.49	5.68	6.32	6.73	5.19	4.35	2.72	1.96
Alma..............	C.	......	**	1.82	1.31	1.45	3.36	5.55	c 6.11	7.47	a 7.63	5.58	a 4.58	... .	h 1.37
Lansing, S. B. of H.‖..........	C.	3.39 ^{22}	3.65	1.63	1.23	1.39	2.95	4.40	5.39	6.25	6.87	5.28	4.39	2.39	1.63
Ann Arbor........	S. C.	......	3.74	1.60	1.23	1.40	2.64	4.41	5.74	6.74	7.51	5.31	4.44	2.26	1.54
Battle Creek......	S. C.	......	††	1.92	f 1.68	a 1.88	3.34	4.88	e 6.26	7,90	9.44	7.38	.....	3.00	1.72
Tecumseh.........	S. C.	......	§§	1.68	1.33	1.51	3.27	4.63	.....	.....	.....	5.74	4.66	2.49	1.66
Birmingham......	S. E.	3.65 ^{14}	3.79	c 1.52	1.18	b 1.29	3.19	b 4.62	e 5.96	a 6.53	a 7.17	c 5.54	a 4.68	d 2.39	c 1.37

* The names of the observers, their places of observation, and the counties in which these places are situated, are stated in Table I.

† The full names of the divisions and the counties in each division are stated in Exhibit I, in the annual report for 1898 and in preceding reports.

‡ The number of grains of vapor in a cubic foot of air at each observation was determined from readings of the psychrometer by means of Glaisher's table, Table XII, of the Smithsonian Meteorological and Physical Tables (1859).

§ Numbers in this column state the average annual absolute humidity for periods of years ending in each case with December 31, 1900. The small figures above at the right of numbers which state the absolute humidity denote the number of years included in the average.

¶ This line is an average for only the 6 stations from which statements nearly complete were received for every month of the year. It does not include the lines for Alma, Battle Creek and Tecumseh.

‖ Beginning with the year 1885, allowance must be made for Lansing in Table IV, because of a change in the location of the instruments. The amount of variation by months is shown in Exhibit C, page 23, report for 1886.

** The average for 11 months is 4.20. †† For 11 months, 4.49. §§ For 9 months, 3.00.

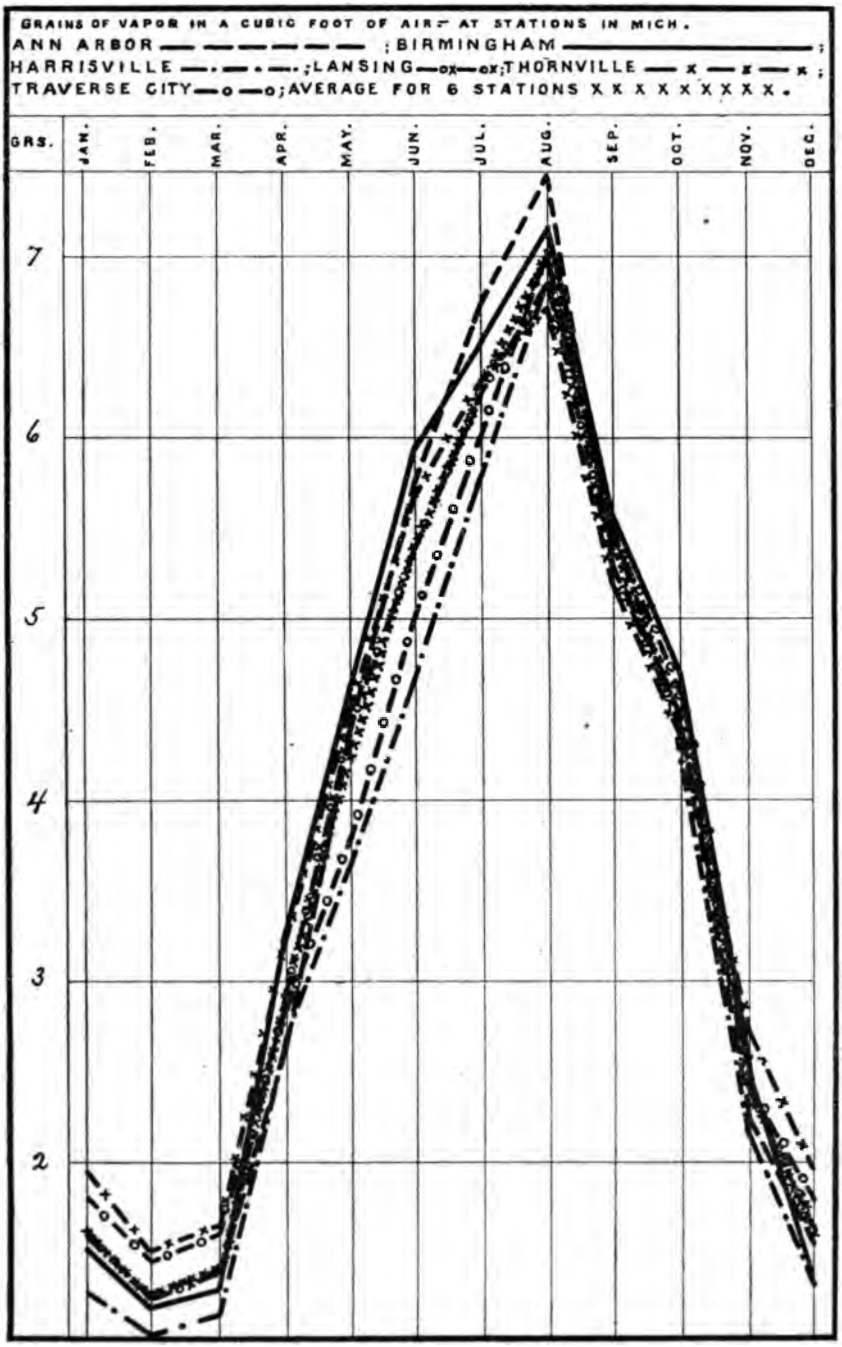
a, b, c. In the columns from January to December, inclusive, the letters a, b, c, etc., stand directly above the numbers from which they refer to the notes below.

a For 92 observations.	b For 90 observations.	c For 89 observations.
d For 88 observations.	e For 87 observations.	f For 81 observations.
g For 58 observations.	h For 54 observations.	

NOTE.—The computations of absolute humidity at Ann Arbor for each month in 1900 were furnished by the observer there. All other computations in Table XIX were made at the office of the Secretary of the State Board of Health.

The "average" line and the lines for seven stations in Table XIX are graphically represented in Diagram III.

DIAGRAM III.- ABSOLUTE HUMIDITY, BY MONTHS, 1900.



[PLATE 1075]

TABLE XX.—RELATIVE HUMIDITY.—*Average per cent of saturation of the atmosphere with vapor of water for months and year 1900 at 10 stations in Michigan; also average line for 7 stations. Average of observations made daily at 7 A. M., 2 P. M. and 9 P. M., by observers* for the State Board of Health.*

Stations in Michigan.*	Divisions of the State.†	Per cent of saturation.—Relative humidity.													
		Year.		Months, 1900.											
		Norm. ‡	1900.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 7 stations§	....	......	79	82	83	81	73	72	76	77	78	77	80	84	80
Traverse City....	N. W.	83^{19}	81	90	95	a 88	75	g 68	71	79	77	80	a 80	84	87
Harrisville........	N. E.	70^{6}	74	68	68	69	77	75	75	77	81	79	78	73	66
Thornville........	B. & E.	78^{23}	79	91	92	a 89	73	69	73	71	71	70	73	88	88
Alma..............	C.	......	‖	90	84	74	71	82	c 69	69	a 76	73	a 81	.....	h 74
Agr'l College......	C.	80^{37}	91	96	98	95	83	85	89	88	89	89	90	95	96
Lansing, S. B. of H.¶..............	C.	72^{22}	73	77	75	74	66	67	69	73	76	73	76	78	76
Ann Arbor........	S. C.	......	78	83	82	82	67	70	75	76	77	73	79	89	80
Battle Creek......	S. C.	......	**	85	f 93	a 88	69	68	e 75	89	93	94	.....	93	74
Tecumseh.........	S. C.	......	††	80	76	78	74	75	.....	.....	.....	77	81	80	78
Birmingham......	S. E.	76^{14}	74	c 72	71	b 68	70	b 71	e 77	a 74	a 77	c 77	a 81	d 78	c 66

* The names of observers, their places of observation, and the counties in which these places are situated, are stated in Table I.

† The full names of the divisions, and the counties in each division are stated in Exhibit I, in the annual report for 1898 and preceding reports.

‡ Numbers in this column state the average annual relative humidity for periods of years ending in each case with December 31, 1900. The small figures above and at the right of the numbers which state the relative humidity, denote the number of years included in the average.

§ This line is an average for only the 7 stations from which statements nearly complete were received for every month in the year. It does not include Alma, Battle Creek and Tecumseh.

¶ Beginning with the year 1885, allowance must be made for Lansing in Table V, because of a change in location of the instruments. The amount of the variation by months is shown in Exhibit D, on page 23, report for 1886.

‖ The average for 11 months is 77. ** For 11 months, 84. †† For 9 months, 78.

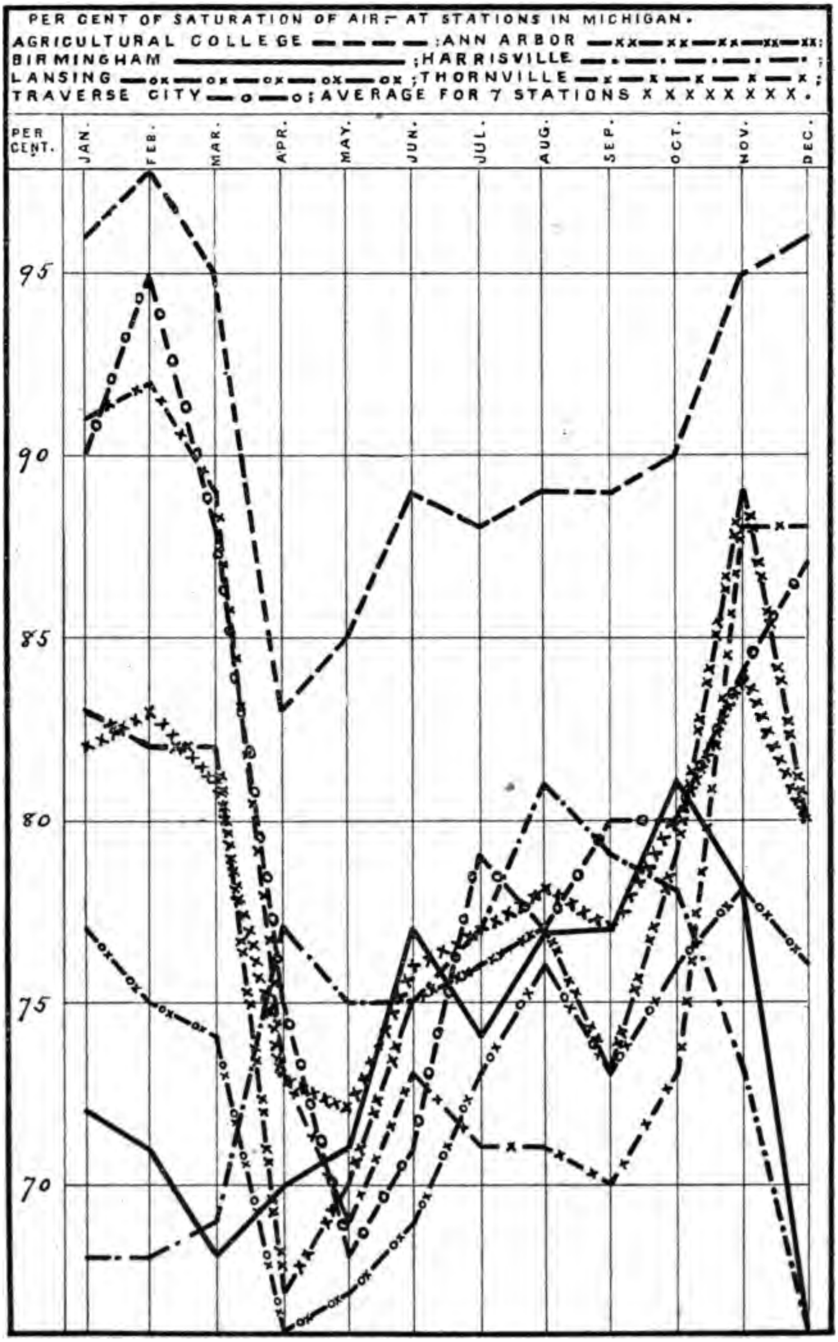
a, b, c. In the columns from January to December, inclusive, the letters a, b, c, etc., stand directly above the numbers from which they refer to the notes below.

a For 92 observations. b For 90 observations. c For 89 observations.
d For 88 observations. e For 87 observations. f For 81 observations.
g For 58 observations. h For 54 observations.

NOTE.—The observations in Table V were reduced by Guyot's table, in Smithsonian Meteorological Tables, or by a table substantially the same as that. Computations for Ann Arbor in 1900 were made by the observer there. All other computations in Table V were made at the office of the State Board of Health.

Graphic representations of eight representative lines in Table XX are given in Diagram IV.

DIAGRAM IV.—RELATIVE HUMIDITY, BY MONTHS, 1900.



[PLATE 1076]

Fogs.—For the year 1900, fog was reported at 40 morning observations, at 4 afternoon observations (at about 2 P. M.), at 8 evening observations (at about 9 P. M.), and 42 times during the day, no special time being mentioned, in many cases the same fog, or fog at the same time, being reported by different observers. Fog was reported, at one or more stations at some time during the day, on 94 days.

TABLE XXI.—*Number of different days on which fog was observed at one or more of 10 stations in Michigan* in 1900, and each month of the year 1900.*

Year.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
73	3	2	1	4	7	1	1	18	9	19	5	3

* This exhibit contains statements only for those localities from which reports were received for every month of the year, as follows: Sault Ste. Marie, Harrisville, Traverse City, Grand Haven, Thornville, Lansing, Ann Arbor, Battle Creek, Birmingham and Detroit.

Table XXI, "Number of different days on which fog was observed," etc., supplies knowledge of the *time*, in each month, on which fog was observed, somewhere in Michigan. Table XXII, "Number of observations at which fog was observed," etc., supplies knowledge of the *time* combined with the *area* of the occurrences of fog. For the State as a whole, therefore, the last mentioned exhibit supplies the most important information. Therefore, in this report the diagram relative to fog is made to exhibit the facts contained in this last-mentioned table. Heretofore it has represented the "Number of different days on which fog was observed at one or more stations in Michigan."

TABLE XXII.—*Number of observations at which fog was observed in Michigan in 1900, and in each month of the year 1900. (Observations taken three times daily,* at 10 stations.)*†

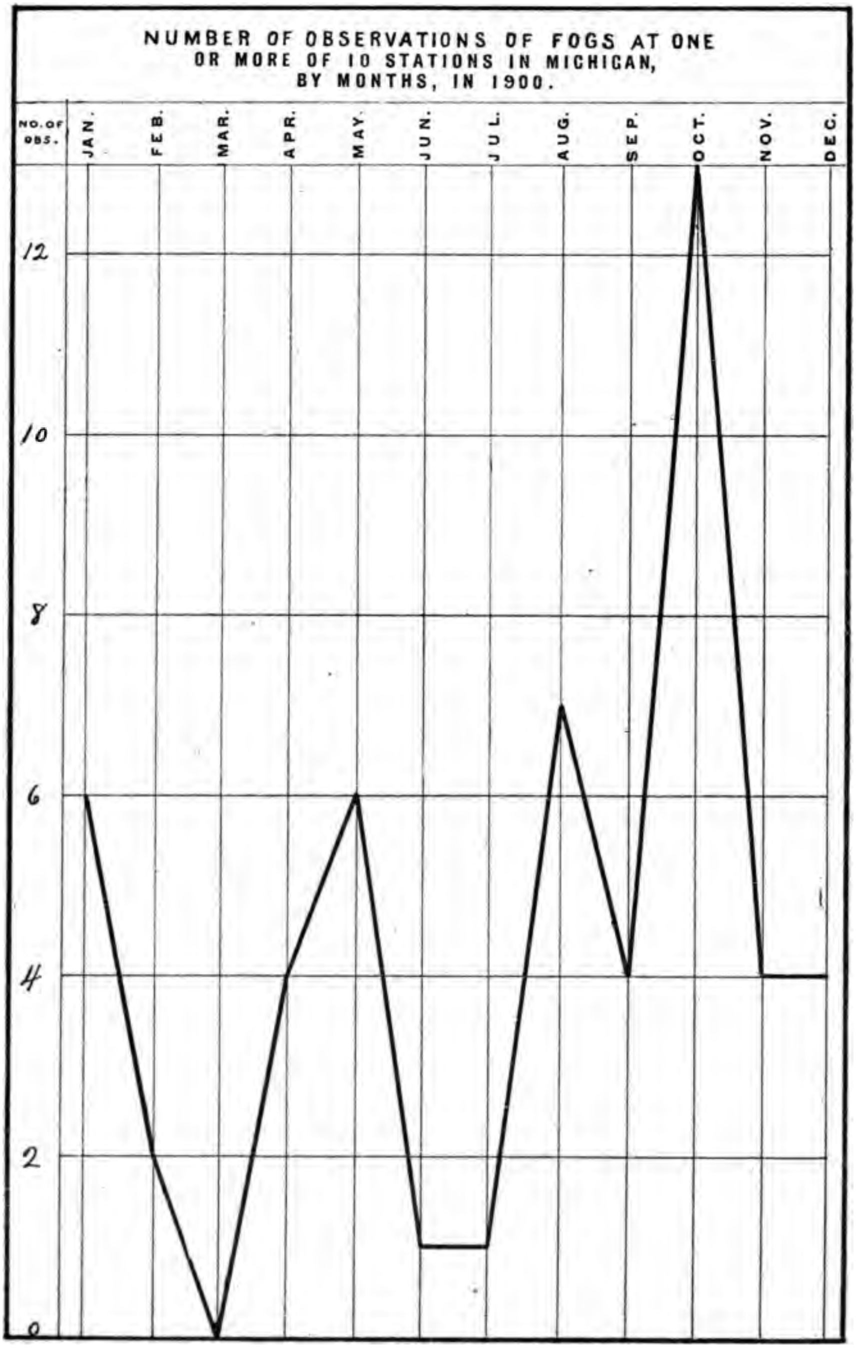
Year.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
52	6	2	0	4	6	1	1	7	4	13	4	4

* At the U. S. Weather Bureau Stations the observations were made at 8 A. M. and 8 P. M., 75th Meridian time.

† This exhibit contains statements only for those localities from which registers were received for every month of the year; the localities are stated in a foot-note to Table XXI, above.

Graphic representations of statements in Table XXII are given in Diagram V.

DIAGRAM V.—CONCERNING FOGS IN MICHIGAN, IN 1900.



[PLATE 1077]

TABLE XXIII.—*Average per cent of cloudiness for months and year 1900, at 10 stations in Michigan; also average line for 9 stations. Average of observations made daily at 7 A. M., 2 P. M. and 9 P. M., by observers* for the State Board of Health.*

Stations in Michigan.*	Divisions of the State.†	Average per cent of cloudiness.													
		Year.		Months, 1900.											
		Norm. ‡	1900.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 9 stations§	....	......	53	78	64	55	43	53	35	44	41	43	45	68	71
Traverse City.....	N. W.	59^{19}	58	86	[i] 79	49	[i] 37	[l] 46	[d] 33	52	43	56	51	[d] 81	83
Harrisville	N. E.	62^{16}	61	86	62	57	52	60	32	52	57	57	53	67	[b] 95
Thornville	B. & E.	51^{24}	49	83	52	48	38	53	31	37	32	34	36	[d] 71	73
Alma..............	C.	48^{3}	47	88	58	52	37	56	34	44	40	27	46	41	35
Agr'l College	C.	56^{37}	46	63	60	48	41	45	26	37	36	37	36	63	64
Lansing, S. B. of H.	C.	57^{22}	56	73	71	55	46	58	42	47	39	43	46	73	77
Ann Arbor........	S. C.	56^{21}	52	[c] 71	[i] 61	56	[e] 46	[a] 52	34	38	[d] 38	[e] 40	[c] 50	[f] 72	[a] 70
Battle Creek......	S. C.	45^{2}	46	[d] 67	[i] 64	62	33	38	[f] 23	31	33	[d] 35	[c] 29	[d] 70	[a] 68
Tecumseh	S. C.	......	¶	[h] 69	[i] 59	48	[f] 42	[c] 43	.....	.....	.....	34	[b] 36	[e] 66	[c] 64
Birmingham......	S. E.	59^{14}	64	[e] 82	[k] 66	[f] 65	[f] 58	[d] 69	[j] 62	[e] 54	[e] 54	[g] 59	[e] 56	[d] 70	[f] 72

* The names of observers, their places of observation, and the counties in which these places are situated, are stated in Table I.

† The full names of divisions and the counties in each division are stated in Exhibit I, in the annual report for 1898 and preceding reports.

‡ Numbers in this column state the average per cent of cloudiness for periods of years ending in each case with December 31, 1900. The small figures above and at the right of numbers which state the per cent of cloudiness, denote the number of years included in the average.

§ This line is an average for all the stations from which statements, nearly complete, were received for every month of the year. It does not include Tecumseh.

¶ The average for 9 months is 51.

a, b, c. In the columns from January to December, inclusive, the letters a, b, c, etc., stand directly above the numbers from which they refer to the notes below.

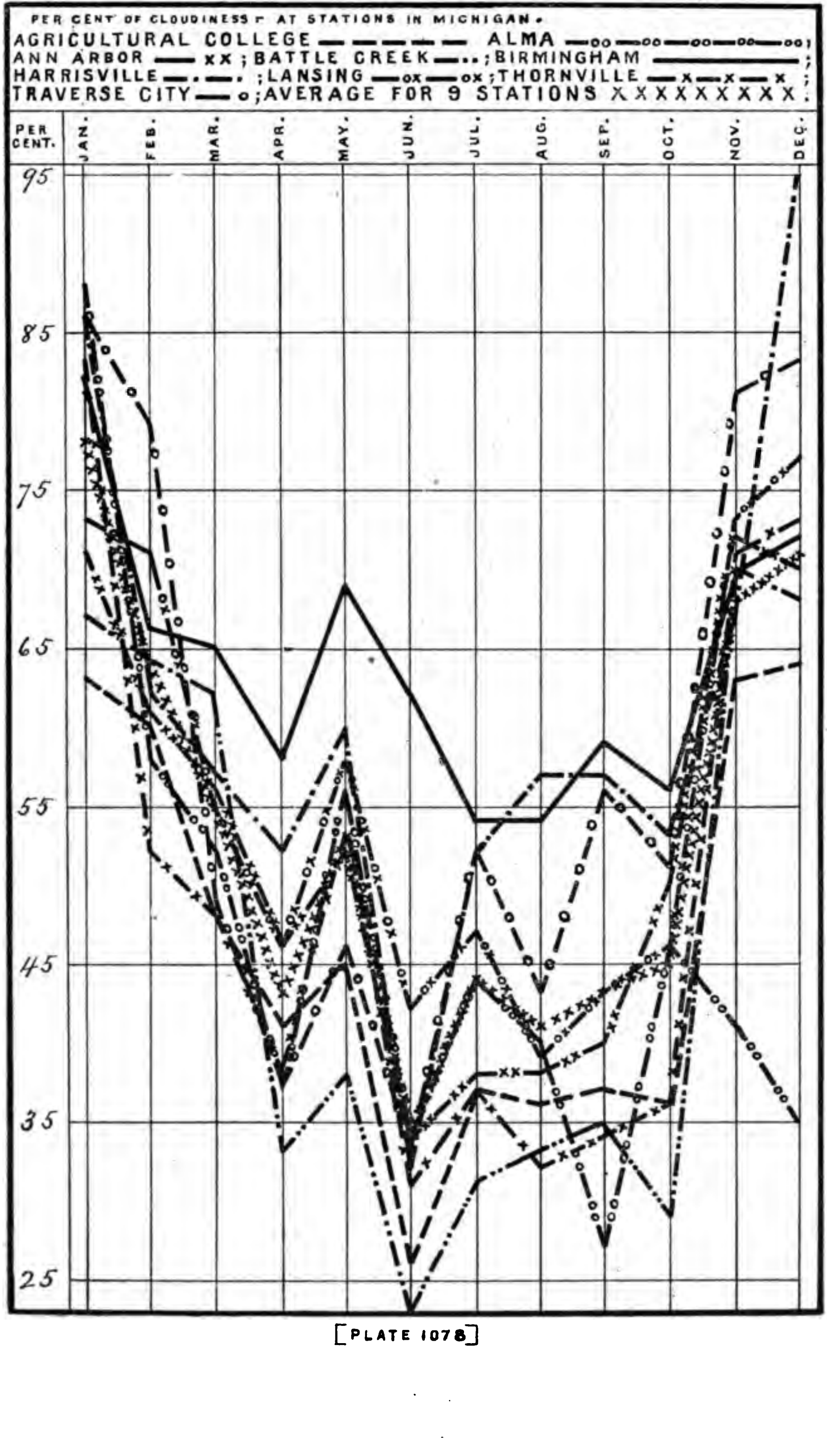
a For 92 observations.	b For 91 observations.	c For 90 observations.	d For 89 observations.
e For 88 observations.	f For 87 observations.	g For 86 observations.	h For 85 observations.
i For 83 observations.	j For 82 observations.	k For 81 observations.	l For 50 observations.

Graphic representations of nine representative lines in Table XXIII are given in Diagram VI.

TABLE XXV.—*Dates of auroras observed and recorded at 3 stations in Michigan during the year 1900.*

Stations.	Dates of auroras recorded in 1900.											
	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Marquette...........	21	......	24,29	......	5,18	....	......	......	......	......	......	......
Lansing, S. B. of H.	20	......	......	......	....	....	......	......	......	......	......	......
Thornville..........	......	......	......	......	....	15	......	......	.....	......	......	......

DIAGRAM VI.– AV. PER CENT OF CLOUDINESS, BY MONTHS, 1900.



[PLATE 1078]

TABLE XXVI.—*Dates of solar and lunar halos*

Line number.	Stations.	Dates of halos recorded,									
		January.		February.		March.		April.		May.	
		Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.
1	Marquette..........	....	....	....	9,10	2	4,6,8	....	....	.....	....
2	Port Huron..........	....	....	25	5,9	29	....	....	....	.....	....
3	Thornville	....	....	....	....	....	....	....	....	.....	....
4	Lansing, S. B. of H..	9,27	8,11	3,5,19,20	9	25,28	12	9	....	6,26	6
5	Detroit..............	....	....	....	....	....	....	....	....	.....	....

TABLE XXIV.—*Average per cent of cloudiness, by year and months, in 1900, compared with annual and monthly averages for 1899, and for 23 years, 1877-99.* These averages are for groups of several stations in Michigan.*

Years, etc.	Per cent of cloudiness.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 23 years, 1877-99	55	71	65	58	52	50	46	40	42	44	56	69	74
1899 (10 stations)....	53	63	55	73	47	51	35	47	31	52	43	68	69
1900 (9 stations).....	53	78	64	55	43	53	35	44	41	43	45	68	71
In 1900 greater than av. for 23 years, 1877-99.....	....	7	......	......	......	3	......	4	......	......	......	......	......
In 1900 less than av. for 23 years, 1877-99	2	......	1	3	9	......	11	......	1	1	11	1	3
In 1900 greater than in 1899......	0	15	9	......	......	2	0	......	10	......	2	0	2
In 1900 less than in 1899...............	....	......	......	18	4	......	......	3	......	9	......	......	......

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* At from 8 to 23 stations per year for the 23 years, 1877-99. Just which stations in each year, up to 1897, are shown on page 48, report for 1898.

recorded on the monthly registers in 1900.

months, 1900.														
June.		July.		August.		September.		October.		November.		December.		Line number.
Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	
....	......	......	......	......	......	....	....	19	......	....	....	....	31	1
....	......	......	......	.....	......	....	....	......	......	....	2	....	2,26	2
11,12	......	......	......	......	......	....	....	......	......	....	2	....	......	3
14,20,22	12,13	......	......	......	......	9,22	....	......	......	....	6,16,23,27	6,15	......	4
....	......	......	......	......	......	....	....	......	......	....	....	....	3,6	5

Parhelia, June 9.—*Thornville;* Jan. 1, 27, 30, Feb. 10, 19, Mar. 2, 17, June 30, Oct. 12, Nov. 16, 27, Dec. 10, 27.—*Lansing.*

TABLE XXVII.—*Inches of rain and melted snow, by year and months in 1900, compared with annual and monthly averages for 1899, and for the 23 years, 1877-99.* These averages are for groups of several stations in Michigan.*

Years, etc.	Inches of rain and melted snow.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 23 years, 1877-99	34.09	2.29	2.30	2.27	2.47	3.52	3.61	2.97	2.95	3.06	3.06	3.04	2.57
1899 (15 stations)....	27.58	1.72	1.29	3.08	1.28	3.14	2.94	3.31	1.17	3.04	2.81	1.45	2.34
1900 (13 stations)....	30.07	1.38	2.92	1.93	1.67	2.99	2.50	4.19	3.23	2.62	2.47	3.39	.78
In 1900 greater than av. for 23 years, 1877-99.....	....	......	.62	.....	......	......	......	1.22	.28	......	......	.35	......
In 1900 less than av. for 23 years, 1877-99...........	4.02	.91	......	.34	.80	.53	1.11	......	......	.44	.59	......	1.79
In 1900 greater than in 1899......	2.49	......	1.63	......	.39	......	......	.88	2.06	......	......	1.94	......
In 1900 less than in 1899..............	....	.34	......	1.15	......	.15	.44	......	......	.42	.34	......	1.56

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* At from 12 to 23 stations per year for the 23 years, 1877-99. Just which stations in each year, up to 1897, are shown on page 50, report for 1898.

TABLE XXVIII.—*Inches of rain and melted snow for months and year 1900, at 15 stations in Michigan; also average line for 13 stations,—as compiled from daily observations made by observers* for the State Board of Health, and for the U. S. Weather Bureau.*

Stations in Michigan.* (Those of the U. S. Weather Bureau in italics.)	Divisions of the State. †	Inches of rain and melted snow.													
		Year.		Months, 1900.											
		Norm. ‡	1900.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 13 stations§	....	......	30.07	1.38	2.92	1.93	1.67	2.99	2.50	4.19	3.23	2.62	2.47	3.39	.78
Marquette.......	U. P.	31.75^{15}	32.22	2.01	2.53	1.78	2.89	2.88	2.26	4.62	1.98	6.51	1.32	1.61	1.83
Sault Ste. Marie.	U. P.	33.23^{9}	30.93	1.19	1.38	.37	1.29	.84	3.16	5.05	4.27	7.25	1.68	2.84	1.61
Traverse City.....	N. W.	36.65^{19}	32.97	1.88	2.73	1.89	1.22	.78	1.89	7.47	3.20	3.51	3.41	3.72	1.27
Alpena............	N. E.	34.26^{28}	23.03	.77	2.07	.76	1.14	1.60	2.41	3.33	2.97	3.23	1.62	2.56	.57
Harrisville........	N. E.	33.51^{14}	30.13	1.20	3.31	2.05	1.31	2.64	.53	4.34	5.23	2.25	2.90	2.95	1.42
Grand Haven....	W.	33.95^{10}	32.33	2.71	3.73	2.06	1.59	2.96	1.43	3.73	4.36	2.15	2.35	4.69	.57
Port Huron......	B. & E.	31.40^{26}	28.73	1.26	3.06	2.17	1.30	3.85	2.60	3.86	4.12	1.32	1.14	3.71	.34
Thornville........	B. & E.	31.97^{24}	29.20	1.03	2.21	1.20	1.35	4.61	4.46	3.06	3.06	1.39	3.24	3.04	.55
Agr'l College.....	C.	30.82^{37}	31.02	1.17	3.44	1.88	2.00	4.17	2.57	4.15	2.98	.87	2.77	4.52	.50
Lansing, S. B. of H............	C.	32.68^{21}	33.29	1.43	2.84	2.20	2.30	4.25	2.19	5.09	3.86	1.27	3.51	3.88	.47
Ann Arbor.......	S. C.	29.62^{13}	28.82	1.06	3.71	2.73	1.43	4.91	2.55	2.91	2.04	1.10	2.23	3.73	.42
Battle Creek.....	S. C.	.....	¶	.95	1.78	2.20	4.30	4.30	.40	5.25	1.51	.....	2.25	2.11	.....
Tecumseh.........	S. C.	......	‖	1.19	4.28	2.14	2.09	2.99	.....	.....	.....	1.63	2.69	4.06	.48
Birmingham......	S. E.	29.45^{14}	26.86	1.11	2.59	2.72	2.24	2.26	2.40	3.21	1.85	1.39	3.14	3.75	.20
Detroit...........	S. E.	32.42^{29}	31.45	1.14	4.30	3.26	1.64	3.08	3.99	3.71	2.08	1.88	2.85	3.10	.42

* The names of observers, their places of observation, and the counties in which these places are situated, are stated in Table I.

† The names of divisions, and the counties in each, are stated in Exhibit I, in the annual report for 1898 and preceding reports.

‡ Numbers in this column state the annual average rainfall for periods of years ending in each case with December 31, 1900. The small figures above and at the right of numbers which state the rainfall denote the number of years included in the average.

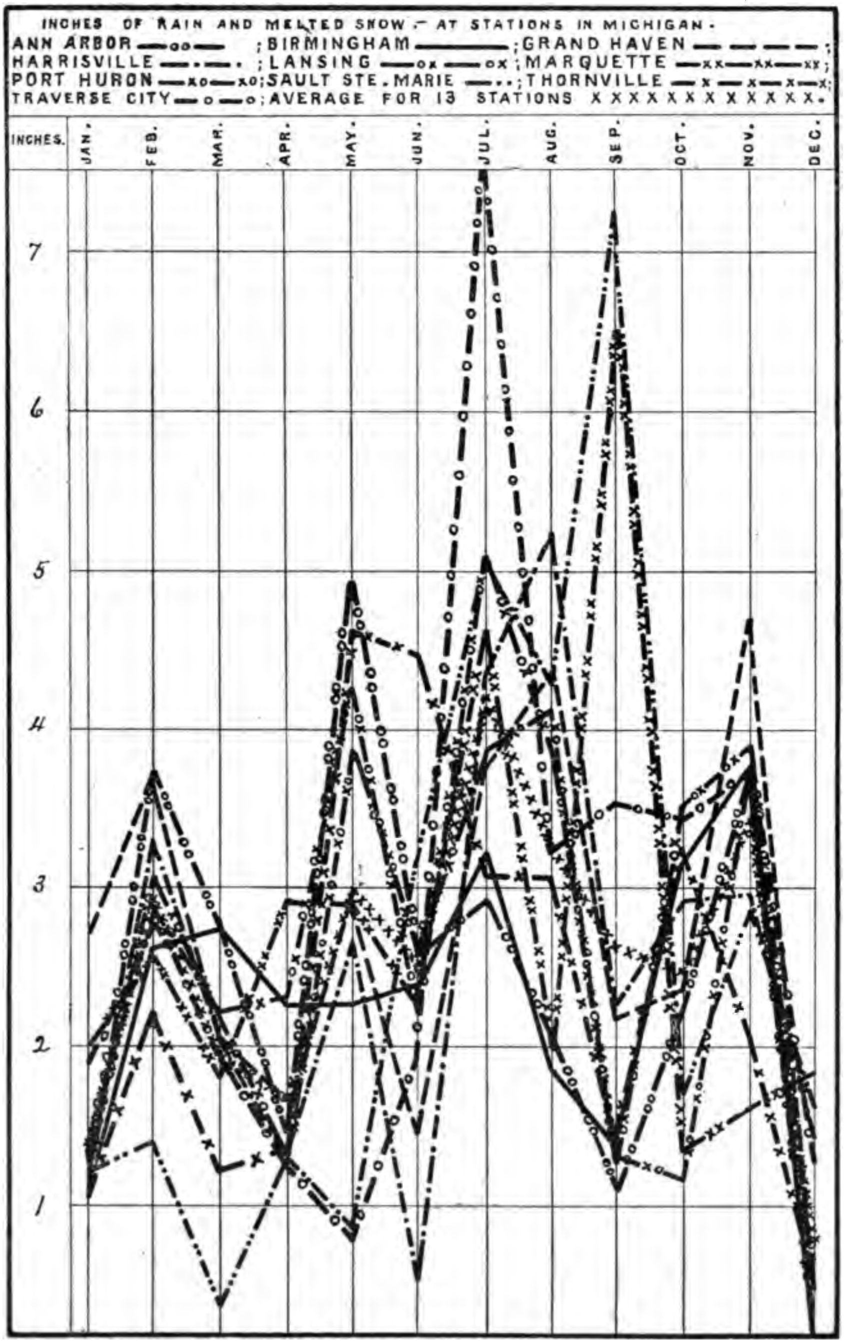
§ This line is an average for all the stations, from which statements are given for every month of the year. It does not include Battle Creek and Tecumseh.

¶ The total rainfall for 10 months is 25.05 inches. ‖ For 9 months, 21.55 inches.

NOTE.—The computations of amount of rainfall were furnished by the observers at Detroit, Alpena, Grand Haven, Port Huron, Ann Arbor, Sault Ste. Marie, Marquette, and the Agricultural College for the year. All other computations in Table XXVIII were made in the office of the Secretary of the State Board of Health.

The average line and lines for ten representative stations in Table XXVIII are graphically represented in Diagram VII.

DIAGRAM VII.- RAINFALL, BY MONTHS, 1900.



[PLATE 1079]

TABLE XXIX.—*Relative amount of ozone in the atmosphere by day, for months and year 1900, at 11 stations, also average lines for 7 stations and for 2 stations in Michigan, as indicated by averages of observations made daily by exposing test-paper prepared according to Schonbein's formula, from 7 A. M. to 2 P. M.—Recorded according to a scale of 10 degrees of coloration of the test-paper (greatest coloration by ozone equals 10) by observers for the State Board of Health, and for the U. S. Weather Bureau.**

Stations in Michigan.† (Those of the U. S. Weather Bureau in italics.)	Divisions of the State. †	Degrees of coloration of test-paper—Day observations.‡													
		Year.		Months, 1900.											
		Norm. §	1900.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.[i]	Dec.
Av. for 7 stations¶	....	......	3.40	3.63	3.72	4.32	3.48	4.05	3.92	3.16	3.87	2.41	2.54	2.84	2.88
Av. for 2 stations‖	....	......	1.93	1.55	1 96	1.87	1.67	2.53	2.30	1.79	2.64	2.02	1.90	1.32	1.59
Traverse City....	N. W.	^{19}5.33	6.33	6.38	6.33	6.53	6.54	^{e}6.65	6.80	5.98	6.92	5.94	5.69	5.85	6.31
Harrisville.......	N. E.	^{16}3.52	2.62	2.80	2.47	2.31	2.00	2.64	2.90	2.30	3.14	2.44	2.56	2.75	3.11
Grand Haven...	W.	......	3.19	2.40	3.27	2.95	2.80	3.26	3.32	3.08	4.90	3.24	3.59	2.40	3.08
Port Huron.....	B. & E.	......	.66	.70	.65	.79	.54	1.80	1.27	.50	.38	.80	.20	.24	.10
Thornville.......	B. & E.	^{24}3.23	4.19	6.02	6.04	6.73	4.07	3.54	3.40	1.72	2.95	2.48	2.72	5.15	5.40
Alma.............	C.	^{3}2.38	1.98	3.47	3.36	3.63	1.74	3.18	2.24	1.21	1.69	.98	.79	.68	.79
Lansing, S. B. of H..........	C.	^{22}2.95	2.24	1.73	2.65	3.05	2.37	3.86	3.47	2.11	2.89	1.84	1.27	1.08	.63
Ann Arbor.......	S. C.	^{8}2.77	3.27	3.09	3.61	4.79	3.50	4.64	4.24	4.95	4.98	1.24	1.14	^{a}1.52	^{a}1.50
Battle Creek.....	S. C.	^{2}2.32	3.19	1.93	^{c}1.59	^{d}3.18	4.14	3.86	4.40	3.88	4.50	1.94	3.59	2.88	2.44
Tecumseh........	S. C.	....	**	3.02	3.61	4.73	4.07	4.76	.....	.....	.....	3.04	2.47	2.11	2.27
Birmingham.....	S. E.	.....	††	^{b}2.45	2.40	2.30	2.50	.....	^{a}2.88	2.24	....	.....	1.98	.....	^{b}1.46

* At the stations of the U. S. Weather Bureau during the year 1900, the observations were made by exposing the test-paper from 8 A. M. to 8 P. M., all 75th Meridian time. The corresponding local time for some of these stations is stated in a foot-note to Table XIV.

† The names of observers, their places of observation and the counties in which these places are situated, are stated in Table I. The full names of the divisions and counties in each division are stated in Exhibit I, in the annual report for 1898 and preceding reports.

‡ Allowance made for difference in sensitiveness of test-paper; explained below. "i."

§ Numbers in this column state the average annual relative amount of ozone by day for periods of years ending in each case with December 31, 1900. The small figures above and at the right of numbers which state the average denote the number of years included in the average.

¶ This line is an average for only the stations from which statements nearly complete were received for every month in the year. It does not include Tecumseh, Birmingham and the Weather Bureau Stations.

‖ This is an average line for Grand Haven and Port Huron.

** The average for 9 months is 3.34. †† For 8 months, 2.28.

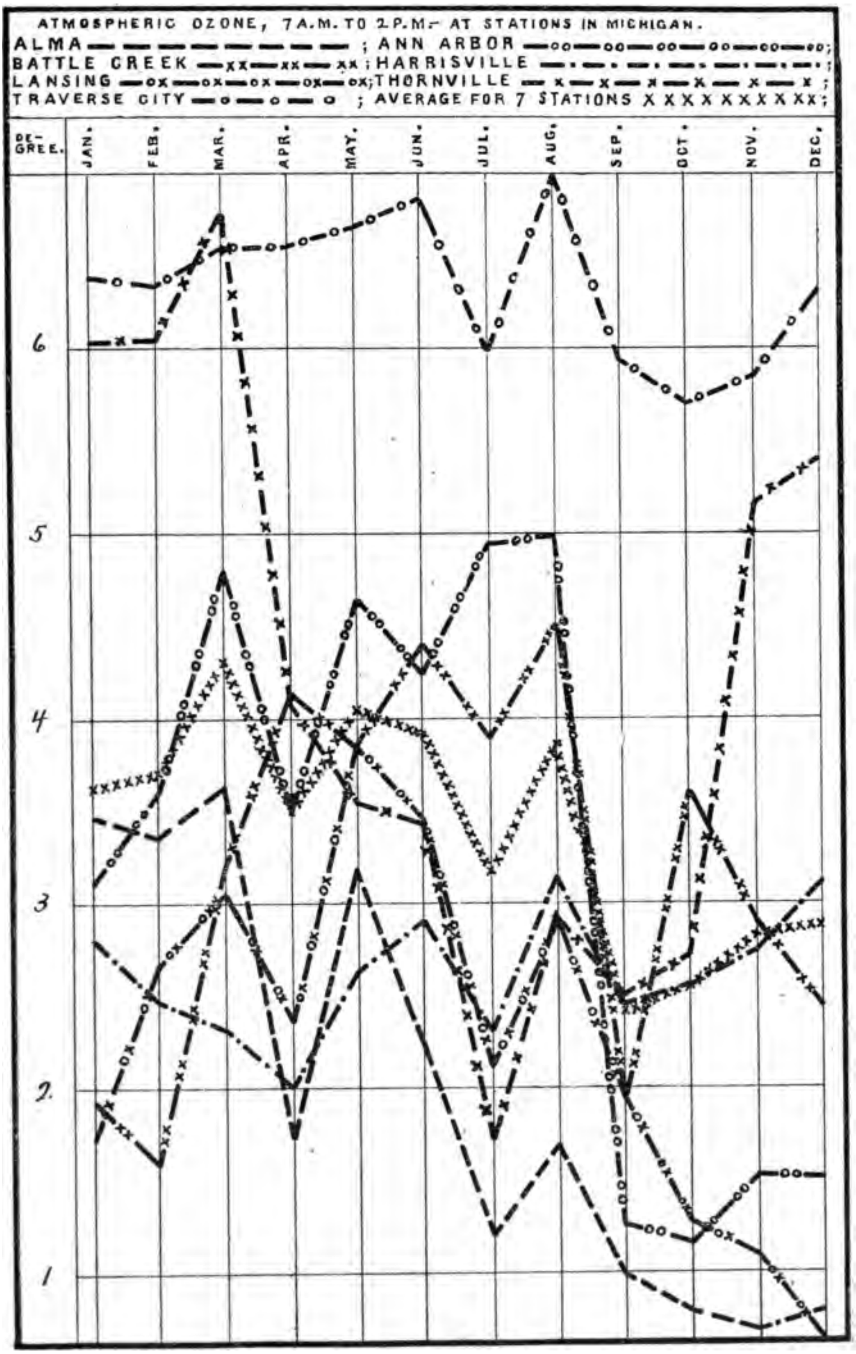
a, b, c. In the columns from January to December, inclusive, the letters a, b, c, etc., stand directly above the numbers from which they refer to the notes below.

a For 29 days. b For 28 days. c For 25 days. d For 24 days. e For 20 days.

i Concerning Ozone Corrections.—It is now believed that the correction (for variation in sensitiveness of different lots of test-paper) applied to the monthly averages in the tables for the day and the night ozone, for the month of November in each of the years 1891, 1892 and 1893, at stations in Michigan and at Lansing, was .39 too great for the day (7 A. M. to 2 P. M.) and .54 for the night ozone (9 P. M. to 7 A. M.). This should be taken into consideration in studying the tables relative to ozone in the annual reports of this board for those years.

Eight lines in this table are represented in Diagram VIII.

DIAGRAM VIII.—OZONE, AV. BY DAY, MONTHS IN 1900.



[PLATE 1080]

TABLE XXX.—*Relative amount of ozone in the atmosphere at night for months and year 1900, at 11 stations, also average line for 7 stations and for 2 stations in Michigan—as indicated by averages of observations made nightly by exposing test-paper, prepared according to Schonbein's formula, from 9 P. M. to 7 A. M.—Recorded according to a scale of 10 degrees of coloration of the test-paper (greatest coloration by ozone equals 10) by observers for the State Board of Health, and for the U. S. Weather Bureau.**

Stations in Michigan.† (Those of the U. S. Weather Bureau in italics.)	Divisions of the State ‡	Degrees of coloration of test-paper.—Night observations.§													
		Year.		Months, 1900.											
		Norm. ¶	1900.	Jan.	Feb.	Mar.	Apr	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 7 stations‖	....	......	3.69	3.52	4 22	4.66	4.23	4.78	4.73	3.45	3.64	2.88	2.13	2.88	3.18
Av. for 2 stat's **	....	......	2.60	1.26	2.50	2.23	1.99	2.93	3.11	2.76	3.72	3.18	2.45	2.66	2.47
Traverse City.....	N. W.	5.27^{19}	6.11	5.96	6.51	6.60	6.64	$\overset{f}{6.38}$	6.78	5.74	6.49	5.78	4.85	5.30	6.25
Harrisville........	N. E.	3.99^{16}	2.89	2.73	3.08	3.15	2.70	3.15	2.98	2.48	3.14	2.34	2.49	3.06	3.38
Grand Haven....	W.	......	4.55	2.08	4.38	3.73	3.37	4.80	4.71	4.61	6.56	5.56	4.80	5.08	4.94
Port Huron......	B. & E.	......	.66	.44	.62	.73	.60	1.06	1.51	.96	.88	.80	.10	.23	0
Thornville........	B. & E.	4.09^{24}	5.60	6.76	7.79	8.47	6.20	5.80	5.68	3.61	4.10	3.71	2.85	5.90	6.31
Alma..............	C.	2.73^{3}	2.10	3.34	3.83	3.63	2.10	3.15	2.34	1.38	1.72	.88	.85	.83	1.15
Lansing, S. B. of H..............	C.	3.29^{22}	2.72	1.92	2.94	2.96	2.74	4.48	4.74	3.29	3.39	2.11	.78	1.60	1.67
Ann Arbor........	S. C.	2.66^{8}	2.95	2.21	2.97	4.50	3.97	4.32	4.24	3.77	2.85	$\overset{b}{2.55}$	$\overset{a}{2.37}$	.56	1.12
Battle Creek......	S. C.	2.81^{9}	3.47	1.73	$\overset{e}{2.41}$	$\overset{d}{3.28}$	5.27	6.15	6.34	3.90	3.81	2.78	.75	2.90	2.35
Tecumseh.........	S. C.	......	††	3.12	4.51	5.31	4.84	5.22	.....	.....	.....	4.18	3.04	3.03	2.64
Birmingham......	S. E.	......	‡‡	$\overset{b}{2.17}$	2.33	2.27	2.47	.....	$\overset{b}{3.05}$	2.61	.....	.....	2.07	.....	$\overset{c}{1.88}$

* At the U. S. Weather Bureau Stations during the year 1900 the observations were made by exposing the test-paper from 8 P. M. to 8 A. M., 75th Meridian time. The corresponding local time for some of these stations is stated in a foot-note to Table XIV.

† The names of observers, their places of observation, and the counties in which these places are situated, are stated in Table I.

‡ The full names of the divisions and the counties in each division are stated in Exhibit I, in the annual report for 1898 and preceding reports.

§ Allowance has been made for difference in sensitiveness in test-paper; explained in foot-note "i," Table VIII.

¶ Numbers in this column state the average annual relative amount of ozone by night for periods of years ending in each case with December 31, 1900. The small figures above and at the right of the numbers which state the average denote the number of years included in the average.

‖ This line is an average for only the stations from which statements, nearly complete, were received for every month in the year. It does not include Tecumseh, Birmingham and the U. S. Weather Bureau Stations.

** This is an average line for Grand Haven and Port Huron.

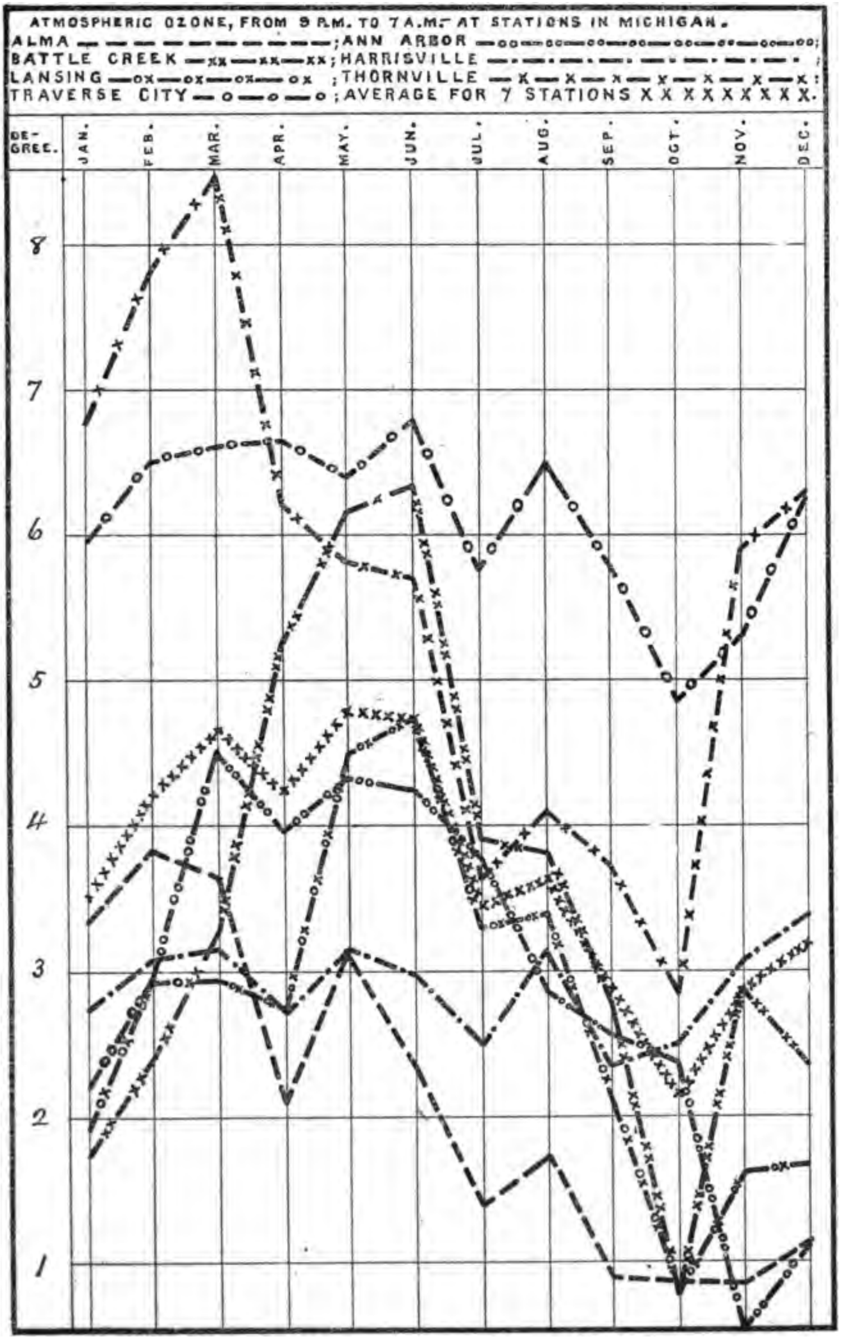
†† The average for 9 months is 3.99. ‡‡ For 8 months, 2.36.

a, b, c. In the columns from January to December, inclusive, the letters a, b, c, etc., stand directly above the numbers from which they refer to the notes below.

a For 30 days. b For 29 days. c For 28 days. d For 25 days. e For 24 days. f For 21 days.

Eight lines in this table are graphically represented in Diagram IX.

DIAGRAM IX.— OZONE, AV. BY NIGHT, MONTHS IN 1900.



[PLATE 1081]

TABLE XXXI.—*Average amount of atmospheric ozone (day), by year and months, in 1900, compared with annual and monthly averages for 1899, and for the 23 years, 1877-99.* These averages are for groups of several stations in Michigan.*

Years, etc.	Ozone by day.—Degrees of coloration of test-paper.†												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 23 years, 1877-99	3.46	3.71	3.81	3.85	3.60	3.73	3.45	2.99	3.45	3.11	3.15	3.20	3.50
1899 (9 stations)....	3.04	3.65	3.36	3.95	3.34	3.61	2.94	2.46	3.01	2.55	2.28	2.56	2.81
1900 (7 stations)....	3.40	3.63	3.72	4.32	3.48	4.05	3.92	3.16	3.87	2.41	2.54	2.84	2.88
In 1900 **greater** than av. for 23 years, 1877-99......	......	......	......	.47	......	.32	.47	.17	.42	......	......	......	......
In 1900 **less** than av. for 23 years, 1877-99............	.06	.08	.09	......	.12	......	......	......	......	.70	.61	.36	.62
In 1900 **greater** than in 1899.......	.36	......	.36	.37	.14	.44	.98	.70	.86	......	.26	.28	.07
In 1900 **less** than in 1899............	......	.02	......	......	......	......	......	......	......	.14	......	......	......

* At from 6 to 20 stations per year for the 23 years, 1877-99. Just which stations in each year, up to 1897, are shown on page 58, report for 1898.

† In this exhibit allowance has been made for difference in sensitiveness of different lots of test-paper.

TABLE XXXII.—*Average amount of atmospheric ozone (night), by year and months, in 1900, compared with annual and monthly averages for 1899, and for the 23 years, 1877-99.* These averages are for groups of several stations in Michigan.*

Years, etc.	Ozone by night.—Degrees of coloration of test-paper.†												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 23 years, 1877-99	3.68	3.96	4.31	4.30	4.01	3.99	3.69	3.09	3.35	3.02	3.30	3.47	3.89
1899 (9 stations).....	3.49	3.50	3.80	4.58	3.99	4.21	3.58	3.05	3.44	2.93	2.67	2.91	3.20
1900 (7 stations)....	3.69	3.52	4.22	4.66	4.23	4.78	4.73	3.45	3.64	2.88	2.13	2.88	3.18
In 1900 **greater** than av. for 23 years, 1877-99......	.01	......	......	.36	.22	.79	.04	.36	.29	......	......	......	......
In 1900 **less** than av. for 23 years, 1877-99............	......	.44	.09	......	......	......	......	......	......	.14	1.17	.59	.71
In 1900 **greater** than in 1899.......	.20	.02	.42	.08	.24	.57	1.15	.40	.20	......	......	......	......
In 1900 **less** than in 1899............	......	......	......	......	......	......	......	......	......	.05	.54	.03	.02

* At from 6 to 20 stations per year for the 23 years, 1877-99. Just which stations in each year, up to 1897, are shown on page 58, report for 1898.

† In this exhibit allowance has been made for difference in sensitiveness of different lots of test-paper.

Observations for Ozone at Lansing.—Since July 1, 1884, the observations for ozone at Lansing have been taken at the new shelter for meteorological instruments in the southwest part of the Capitol yard. Previous to July 1, 1884, the observations had been taken at the office window. Exhibit E, page 60, of the report for 1885, shows that the average for the month of July, 1884, is greater at each observation—7 A. M. to 2 P. M., 2 P. M. to 9 P. M., and 9 P. M. to 7 A. M., at the shelter for instruments than at the office window. Possibly this fact should be taken into consideration in studying ozone at Lansing through a long period of years.

TABLE XXXIII.—*Average velocity of the wind in miles per hour, by year and months in 1900, compared with annual and monthly averages for 1899, and for the 18 years, 1882-99.* From registers of the Robinson self-registering anemometer.† These averages are for groups of several stations in Michigan.*

Years, etc.	Average miles per hour.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 18 years, 1882-99*	9.6	10.8	10.8	10.8	10.4	9.5	7.9	7.8	7.6	8.7	9.6	10.8	11.0
1899 (8 stations)....	9.3	11.9	9.3	11.2	9.3	9.2	8.9	7.4	7.3	8.9	8.4	8.3	11.9
1900 (7 stations)....	9.8	11.6	11.6	11.5	9.0	9.1	8.5	9.4	7.1	9.1	8.3	10.9	11.4
In 1900 greater than av. for 18 years, 1882-99......	.2	.8	.8	.7	......	......	.6	1.6	......	.4	......	.1	.4
In 1900 less than av. for 18 years, 1882-99............	....	......	......	......	1.4	.4	......	......	.5	......	1.3	......	......
In 1900 greater than in 1899........	.5	......	2.3	.3	......	......	......	2.0	......	.2	......	2.6	......
In 1900 less than in 1899............	....	.3	......	......	.3	.1	.4	......	.2	......	.1	......	.5

* At from 6 to 9 stations per year for the 18 years, 1882-99.

† Gibbon's anemometer was used at Ann Arbor.

TABLE XXXIV.—*Average velocity of the wind in miles per hour, by months for the 20 years, 1880-99, and comparisons of 1900 with this average and with the year 1899. From registers of the Robinson self-registering anemometer in the office of the State Board of Health, State Capitol, Lansing, Michigan.*

Years, etc.	Miles, by self-registering anemometer.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 20 years, 1880-99	9.8	11.1	11.4	11.3	11.0	9.6	8.3	7.7	7.2	8.4	9.0	10.9	11.1
1899.................	9.1	12.1	9.1	11.8	9.7	8.2	8.6	7.7	6.8	8.1	7.5	7.6	11.8
1900...........	9.6	11.2	11.4	11.2	9.8	9.0	8.2	9.1	7.1	9.4	6.9	10.5	11.9
In 1900 greater than av. for 20 years, 1880-99.....	....	.1	0	......	......	......	......	1.4	......	1.0	......	......	.8
In 1900 less than av. for 20 years, 1880-99	.2	......	......	.1	1.2	.6	.1	......	.1	......	2.1	.4	......
In 1900 greater than in 1899......	.5	......	2.3	......	.1	.8	.....	1.4	.3	1.3	......	2.9	.1
In 1900 less than in 1899..............	....	.9	......	.6	......	......	.4	......	......	......	.6	.....	......

TABLE XXXV.—*Average velocity of the wind in miles per hour for each hour of the day, by months of the year 1900. Compiled from registers of the Robinson self-registering anemometer, exposed above the roof of the Capitol, and registering in the office of the State Board of Health, Lansing, Mich.*

Months.	Averages.			Hours (1900) and average miles per hour.																							
	Av. 21 years, 1880–1900.	1899.	1900.	A. M.					P. M.												A. M.						
				7-8	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5	5-6	6-7
Year..........	9.7	9.1	9.7	9.0	9.6	10.5	11.4	11.8	12.5	12.3	12.1	11.3	10.6	9.7	9.1	8.7	8.7	8.8	8.6	8.5	8.6	8.4	8.5	8.5	8.1	8.1	8.4
January......	11.1	12.1	11.2	*10.3	10.9	12.5	13.1	12.8	13.5	13.4	12.9	11.8	10.8	10.6	10.5	10.2	10.7	10.5	11.4	11.0	10.9	10.6	10.7	10.3	9.9	9.8	9.8
February.....	11.4	9.2	11.3	†10.4	10.7	12.5	13.5	14.0	15.0	14.9	14.2	13.7	11.7	10.1	10.3	10.0	10.0	10.5	9.6	9.1	9.4	9.5	10.1	10.8	10.8	10.5	10.9
March........	11.3	11.8	11.3	*9.3	10.5	11.5	12.9	13.7	14.7	14.0	13.6	13.3	13.2	11.3	12.2	11.4	11.0	11.0	10.4	9.6	9.9	9.6	9.6	9.8	9.4	9.4	9.5
April.........	10.9	9.6	10.0	9.4	10.6	11.2	12.6	12.7	12.5	11.9	12.1	11.8	11.4	10.2	8.9	8.6	8.7	9.3	9.0	8.9	9.0	8.6	8.7	9.1	8.4	8.0	8.1
May..........	9.5	8.2	9.0	*8.9	9.0	9.7	10.1	10.9	12.1	11.8	12.3	11.4	11.0	10.9	9.0	8.0	7.4	7.2	7.2	7.5	7.9	7.8	7.4	7.2	7.3	6.8	7.5
June..........	8.3	8.5	8.2	†8.3	8.8	9.0	10.3	11.0	12.3	11.7	11.3	10.3	9.8	9.2	7.6	6.2	6.0	6.2	6.5	6.8	6.5	6.6	6.7	6.4	6.0	6.5	7.7
July..........	7.8	7.7	9.1	9.4	9.6	9.9	10.8	10.7	11.4	10.9	11.3	11.1	10.6	9.8	8.6	7.5	8.0	8.8	8.0	7.9	7.9	8.0	8.1	7.8	7.5	7.3	8.1
August.......	7.2	6.8	7.1	*6.5	7.5	8.1	8.8	9.2	9.6	9.8	9.9	8.6	8.5	7.2	5.7	5.6	5.8	5.8	5.7	6.4	6.8	6.3	6.0	5.8	5.5	5.5	5.9
September....	8.4	8.1	9.3	8.8	9.6	10.3	11.1	11.2	11.4	11.2	11.2	11.1	10.3	9.0	8.3	8.7	9.1	8.8	8.9	9.0	8.9	8.3	8.5	8.0	7.3	7.6	7.6
October......	8.9	7.5	6.9	‡5.8	6.3	7.4	7.9	8.3	9.2	9.2	8.4	7.9	6.7	6.1	6.1	6.3	6.6	6.5	6.2	6.2	6.3	6.0	6.5	6.2	6.1	6.7	6.3
November....	10.9	7.6	10.5	11.1	11.2	11.9	12.4	13.3	13.6	13.7	12.8	11.2	10.2	9.5	10.3	10.0	9.4	9.4	9.0	9.0	9.2	9.3	9.3	9.5	8.7	9.2	9.8
December....	11.2	11.8	11.9	§10.3	10.6	11.7	12.7	13.4	14.7	14.7	14.6	13.7	12.4	12.1	12.2	12.3	11.8	11.6	11.3	11.1	10.9	10.4	10.4	11.1	10.4	10.3	10.1

* For only about 30 days. † For only about 25 days. ‡ For only about 28 days. § For only about 29 days.

The statements in the third figure column in Table XXXV, of the average velocity of the wind in miles per hour, by months, during the year 1900, are graphically represented in Diagram XI. The remaining columns of Table XXXV, for 1900, are graphically represented in Diagram X.

DIAGRAM X.—VELOCITY OF WIND, BY HOURS AND MONTHS, 1900.

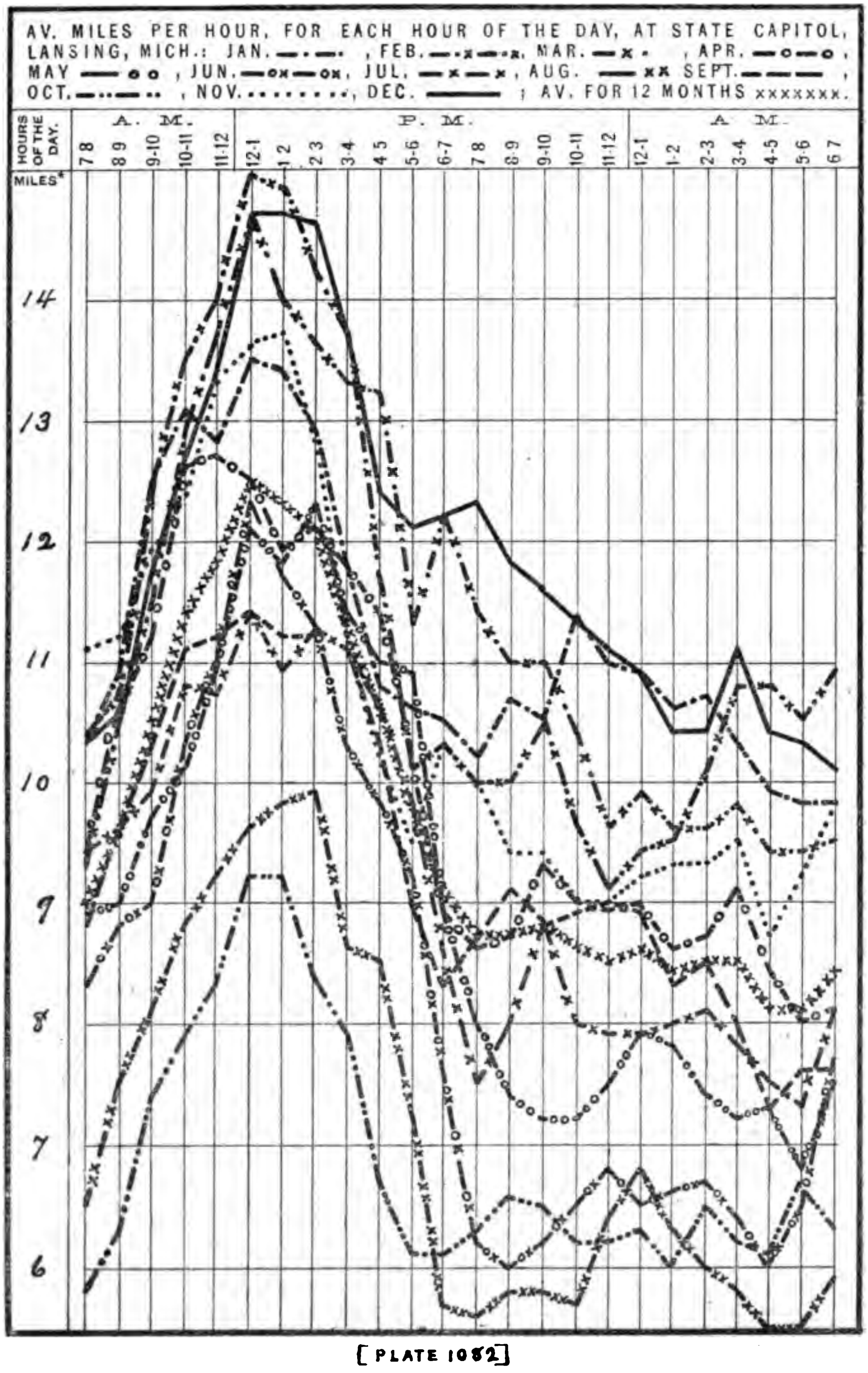


TABLE XXXVI.—*Average velocity of the wind in miles per hour for the year and for each month of the year 1900, at 8 stations in Michigan; also average for 7 stations. Computed from registers of the Robinson self-registering anemometer,* by observers for the State Board of Health, and for the U. S. Weather Bureau.*

Statistics in Michigan.†	Divisions of the State.	Miles, by self-registering anemometer.													
		Year.		Months, 1900.											
		Norm. ‡	1900.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 7 stations§	......	......	9.8	11.6	11.6	11.5	9.0	9.1	8.5	9.4	7.1	9.1	8.3	10.9	11.4
Marquette........	U. P.	9.7^{15}	10.4	12.9	12.3	11.0	7.3	9.4	9.1	10.1	8.0	10.8	11.4	10.5	11.6
Sault Ste. Marie..	U. P.	8.7^{9}	8.7	11.2	9.9	10.6	7.5	8.4	8.0	8.6	5.5	7.5	7.5	9.1	9.5
Alpena............	N. E.	9.4^{2}	9.8	11.5	11.6	11.2	8.7	9.1	8.9	9.5	7.3	9.6	9.0	9.9	11.0
Grand Haven.....	W.	......	¶	11.8	11.9	11.4	9.5	9.3	7.7	9.2	.....	9.3	7.5	13.7	14.8
Port Huron..	B. & E.	10.7^{19}	11.1	12.2	13.3	13.4	11.0	10.4	9.7	10.2	7.9	10.2	9.2	12.9	12.8
Lansing, S. B. of H............	C.	9.7^{21}	9.6	11.2	11.4	11.2	9.8	9.0	8.2	9.1	7.1	9.4	6.9	10.5	11.9
Ann Arbor........	S. C.	8.0^{5}	8.8	9.5	11.2	11.7	9.4	8.6	6.9	8.4	6.1	6.9	5.9	10.5	10.4
Detroit............	S. E.	9.9^{19}	10.1	11.7	11.5	11.5	9.6	8.8	8.5	9.7	7.5	9.1	7.9	12.6	12.7

* Gibbon's anemometer was used at Ann Arbor.

† The names of observers, their places of observation, and the counties in which these places are situated are stated in Table I.

‡ Numbers in this column state the average velocity of the wind in miles per hour for periods of years ending in each case with December 31, 1900. The small figures above and at the right of numbers which state the average denote the number of years included in the average.

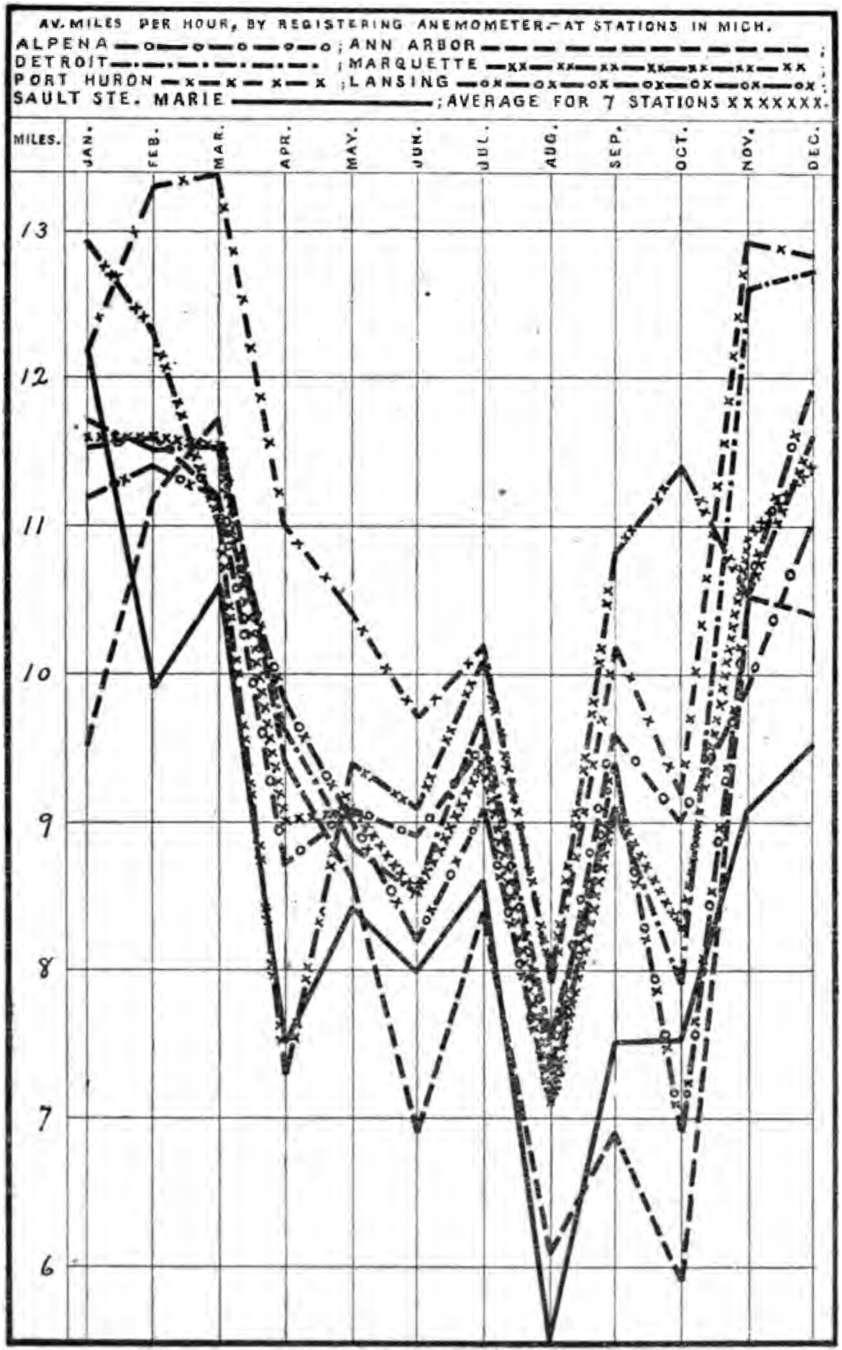
§ Not including Grand Haven.

¶ The average for 11 months is 10.6.

Graphic representations of statements made in Table XXXVI are given in Diagram XI.

Diagrams relating to meteorological conditions.—Most of the diagrams in this paper are to be read by tracing each irregular line across the diagram from left to right, and noting at what point it intersects each of the perpendicular lines having the name of the month at the top. What station is represented by the irregular line may be learned from the head of the diagram. The degree of value denoted by the intersection may be learned by referring to the figures in the left-hand column. Thus in Diagram I, relating to average temperature in 1900, tracing the line "— · —" representing Harrisville, it may be seen that the average temperature at Harrisville was, in January, about 24°, in May about 51°, in August about 66°, in December about 26°, etc. Definite numerical statements of the average temperature for each month at each station may be found in Table IX, and accompanying each diagram is a table giving exact numerical statements for the conditions represented. The average lines given in each table are represented in the corresponding diagram by an × line, thus × × × ×. The lines in the diagrams give more ready general comparisons of stations with each other, or of months, with each other, than is possible from the mere numerical statements. By Diagram II, it appears at a glance that the average

DIAGRAM XI.— VELOCITY OF WIND, BY MONTHS, 1900.



[PLATE 1083]

daily range of temperature at Birmingham in 1900 was, during September, greater than at any other of the ten stations represented in that diagram, and during December was less at Marquette. The marked agreement in the course of lines in Diagram I, representing mean monthly temperature at eight stations, and also that the agreement is closer in October and November than in the other months, appear at once on reference to the diagram. The resemblance between the lines in Diagram I, relating to mean temperature by months in 1900, and those in Diagram III, relating to absolute humidity of the atmosphere for the same periods, is apparent. By Diagram X, it appears that in every month of the year the highest velocity of the wind (on an average for the month) is reached between 12 M. and 2 P. M., and that the lowest velocity ocurs in the latter part of the night or in early morning, and that in 1900 at Lansing, the months of most wind were February, March and December. By reference to Diagram XI, it may be seen that at other stations in Michigan where records of actual miles of wind traveled were kept, March was in 1900 the month of greatest wind. These statements illustrate the reading of the diagrams for any use it may be desired to make of the tables and diagrams.

Diagrams XII, XIII, XIV and XV, relating to the direction of the wind, are constructed on a plan different from that of the other diagrams. A description of the plan of their construction, method of reading, etc., is printed on page 62 of the annual report for 1898, and in preceding reports.

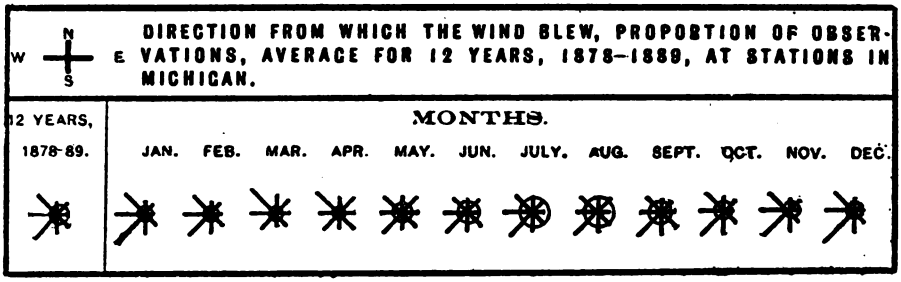
TABLE XXXVII.—DIRECTION OF WIND, 1878-89.—*Number of observations per month (made tri-daily), at which the wind was blowing from the several (eight) points of compass.—Annual and monthly averages for the 12 years, 1878-89, at stations in Michigan.**

Points of compass.	Average number of observations per month—12 years, 1878-89.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
All observations...	91	93	85	93	90	93	90	93	93	89	92	90	93
Calm................	5	4	4	4	4	5	6	8	8	6	5	4	4
North................	7	6	6	10	9	8	7	8	8	6	8	6	6
Northeast..........	8	6	7	10	11	11	9	8	10	7	8	7	5
East.................	6	5	6	7	8	8	6	5	6	6	5	5	5
Southeast..........	9	9	9	9	11	11	10	8	9	11	9	7	8
South................	10	11	10	7	8	10	11	10	10	12	12	11	11
Southwest.........	17	22	16	12	12	15	16	18	17	18	18	19	23
West.................	14	16	14	14	11	12	13	16	12	12	13	17	17
Northwest..........	14	15	13	19	16	13	11	13	13	12	14	15	14

* At 12 stations in 1878; 16 in 1879; 19 in 1880; 19 in 1881; 21 in 1882; 19 in 1883; 21 in 1884; 21 in 1885; 16 in 1886; 17 in 1887; 13 in 1888, and 11 in 1889.

Graphic representations of statements made in Table XXXVII, are given in Diagram XIII.

DIAGRAM XIII.—WIND, DIRECTION, IN MICH., AVERAGE 12 YEARS, 1878–1889.


DIRECTION FROM WHICH THE WIND BLEW, PROPORTION OF OBSERVATIONS, AVERAGE FOR 12 YEARS, 1878–1889, AT STATIONS IN MICHIGAN.

*SCALE, RADIUS .01 OF ONE INCH TO ONE OBSERVATION

[PLATE 675.]

TABLE XXXVIII.—*Number of observations per month (at 7 A. M., 2 P. M. and 9 P. M., daily), at which the wind was blowing from each of the 8 principal points of compass, during the year and during each month of the year 1900. Average for 8 stations in Michigan.**

Points of compass.	Average number of observations per month, 1900.												
	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
All observations (8 stations)..........	90	93	84	92	90	88	88	91	92	90	93	90	92
Calm................	3	1	1	1	3	2	4	3	5	3	6	2	2
North	6	6	3	6	9	9	9	6	5	7	6	5	2
Northeast..........	9	4	6	13	22	11	15	4	5	6	6	6	5
East................	5	3	2	7	7	8	9	5	2	4	4	2	3
Southeast	9	9	9	8	8	9	8	7	8	11	15	5	7
South	10	7	10	6	5	6	8	13	14	13	15	7	10
Southwest..........	23	28	14	20	17	19	16	27	31	23	24	26	26
West....	14	17	18	12	14	14	9	13	12	10	9	22	18
Northwest	14	18	21	18	5	11	10	14	9	12	9	17	19

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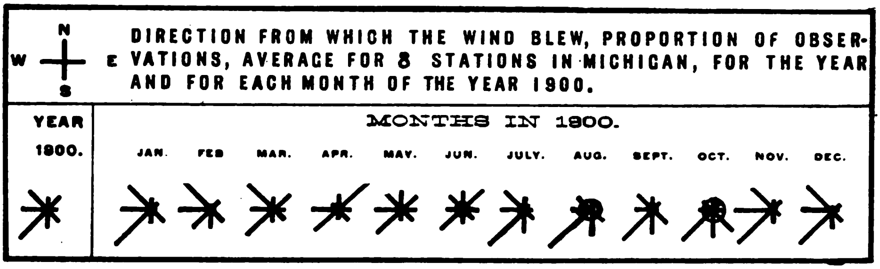
* The names of observers, their places of observation, and the counties and divisions of the State in which those places are situated are stated in Table I.

Graphic representations of statements in Table XXXVIII, are given in Diagram XIV.

DIAGRAM XIV.—WIND, DIRECTION, IN MICH., YEAR AND MONTHS, 1900.


DIRECTION FROM WHICH THE WIND BLEW, PROPORTION OF OBSERVATIONS, AVERAGE FOR 8 STATIONS IN MICHIGAN, FOR THE YEAR AND FOR EACH MONTH OF THE YEAR 1900.

[PLATE 1085]

TABLE XXXIX.—*Average number of observations per month for the year 1900, at which the wind was blowing from each of the 8 principal points of the compass, at each of 8 stations* in Michigan; also the average line for the 8 stations.*

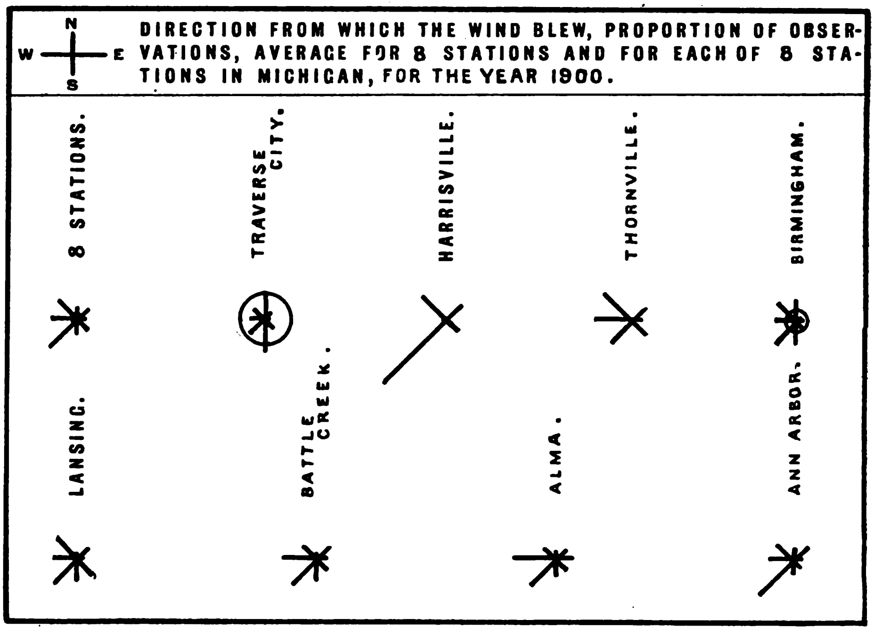
Stations in Michigan.*	Divisions of the State.†	Average number of observations per month, 1900.									
		All obs.	Calms.	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.
Average for 8 stations........	....	90	3	6	9	5	9	9	22	14	14
Traverse City..................	N. W.	88	14	15	5	2	7	18	12	8	8
Harrisville.....................	N. E.	91	0	0	12	0	10	0	49	2	18
Thornville.....................	B. & E	91	0	1	11	6	14	2	16	20	21
Alma..........................	C.	91	0	4	8	10	8	10	20	23	8
Lansing, S. B. of H...........	C.	91	0	4	9	4	12	12	19	14	17
Ann Arbor.....................	S. C.	91	2	7	10	5	6	8	27	14	13
Battle Creek..................	S. C.	91	1	4	11	7	8	12	19	19	10
Birmingham...................	S. E.	86	6	12	3	4	6	13	17	12	14

* The names of observers, their places of observation, and the counties in which these places are situated are stated in Table I.

† The full names of the divisions and the counties in each division are stated in Exhibit I, in the annual report for 1898 and preceding reports.

Graphic representations of statements in Table XXXIX, are given in Diagram XV.

DIAGRAM XV.—WIND, DIRECTION, AT STATIONS IN MICHIGAN, 1900.



[PLATE 1086]

TABLE XL.—*Number of observations for months and year 1900, at which the wind was blowing from each of the 8 principal points of the compass, at 9 stations* in Michigan; also average line for 8 of the said stations from which nearly complete observations were received for the year. (Observations were made at 7 A. M., 2 P. M. and 9 P. M., daily.)*

Stations in Michigan.*	Divisions of the State.*	January.										February.										March.									
		Total.	Calm.	N.	N. E	E.	S. E.	S.	S. W.	W.	N. W	Total.	Calm.	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W	Total.	Calm.	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W
Av. 8 stations†	....	93	1	6	4	3	9	7	28	17	18	84	1	3	6	2	9	10	14	18	21	92	1	6	13	7	8	6	20	12	18
Traverse City	N. W.	93	9	10	1	2	10	18	18	12	13	84	5	10	3	0	12	18	9	14	13	91	9	21	3	4	11	13	9	7	14
Harrisville	N. E.	93	0	0	5	0	7	0	58	2	21	84	0	1	6	2	1	0	44	4	26	93	0	0	21	0	8	0	39	2	23
Thornville	B. & E.	93	1	6	0	1	17	1	11	18	38	84	0	0	1	0	18	0	5	24	36	93	0	0	13	4	7	0	16	21	32
Alma	C.	93	0	1	0	0	0	0	47	35	10	84	0	2	16	3	4	15	2	26	16	93	0	1	16	14	13	5	29	7	8
Lansing, S. B. of H.	C.	93	0	9	7	5	13	9	19	14	17	84	0	3	7	1	14	12	8	17	22	93	0	4	12	14	7	6	13	13	24
Ann Arbor	S. C.	93	0	5	6	12	7	3	37	7	16	84	0	2	6	3	9	6	16	26	16	93	0	5	20	5	6	1	24	11	21
Battle Creek	S. C.	93	0	4	9	5	11	13	17	23	11	84	0	4	7	2	12	13	11	23	12	93	0	6	13	10	8	6	18	20	12
Tecumseh	S. C.	93	3	7	4	14	6	13	25	6	15	84	2	0	9	8	6	10	5	28	16	93	1	3	16	5	5	12	17	13	21
Birmingham	S. E.	89	1	9	3	2	8	11	18	21	16	82	1	3	3	6	4	12	14	13	26	86	0	13	6	8	5	14	9	18	13

* Names of observers, etc., are given in Table I. Names of divisions, etc., are given in Exhibit I, in the annual report for 1898 and in preceding reports.

† This line includes only the 8 stations from which statements complete, or nearly complete, were received for every month of the year. It does not include Tecumseh.

Graphic representations of statements for eight lines in this table are given in Diagram XII, which is explained on page 62 of the annual report for 1898, and in preceding reports.

TABLE XL.—CONTINUED.—*Direction of wind, months in 1900.—Observations at which the wind was blowing from direction named.*

Stations in Michigan.*	Divisions of the State.*	April.										May.										June.									
		Total.	Calm.	N.	N. E.	E.	S.E.	S.	S.W.	W.	N.W.	Total.	Calm.	N.	N. E.	E.	S. E.	S.	S.W.	W.	N.W.	Total.	Calm.	N.	N. E.	E.	S. E.	S.	S.W.	W.	N.W
Av. 8 stations †..	....	90	3	9	22	7	8	5	17	14	5	88	2	9	11	8	9	6	19	14	11	88	4	9	15	9	8	8	16	9	10
Traverse City....	N. W.	90	21	28	10	2	8	8	9	3	1	59	7	17	5	2	4	6	7	5	6	90	17	33	5	1	5	15	4	6	4
Harrisville	N. E.	90	0	0	37	0	10	0	35	2	6	93	0	0	25	0	12	0	40	1	15	90	0	2	12	0	15	0	44	0	17
Thornville.......	B. & E.	90	0	2	36	5	13	1	10	23	0	93	0	1	18	9	12	4	12	17	20	90	0	0	19	28	8	2	15	12	6
Alma	C.	90	0	0	27	12	8	8	22	13	0	91	0	4	3	27	13	5	7	27	5	90	0	6	4	16	9	7	7	30	11
Lansing, S. B. of H.........	C.	90	0	6	17	4	14	10	9	19	11	93	0	3	12	3	15	9	18	20	13	90	0	7	17	7	10	16	9	7	17
Ann Arbor......	S. C.	90	0	7	22	13	0	4	18	17	9	93	0	8	13	7	5	6	30	11	13	90	3	12	21	1	3	14	23	7	6
Battle Creek....	S. C.	90	0	4	25	10	4	2	19	19	7	93	0	10	13	10	5	0	30	16	9	85	0	3	31	19	3	0	16	6	7
Tecumseh	S. C.	90	6	1	20	4	13	9	22	0	15	93	2	4	17	7	8	8	19	3	25	......	......	....	....	....	....	..	....	....	....
Birmingham	S. E.	87	2	23	4	12	7	7	16	13	3	89	6	26	2	5	4	17	10	12	7	82	10	12	11	3	11	10	9	7	9

*† These foot-notes are at bottom of first page of this table.

Graphic representations of statements for eight lines in this table are given in Diagram XII, which is explained on page 62 of the annual report for 1898, and in preceding reports.

TABLE XL.—CONTINUED.—*Direction of wind, months in 1900.—Observations at which the wind was blowing from direction named.*

Stations in Michigan.*	Divisions of the State.*	July.										August.										September.									
		Total.	Calm.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Total.	Calm.	N.	N.E.	E.	S.E.	S	S.W.	W.	N.W.	Total.	Calm.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.
Av. 8 stations †	......	91	3	6	4	5	7	13	27	13	14	92	5	5	5	2	8	14	31	12	9	90	3	7	6	4	11	13	23	10	12
Traverse City	N. W.	93	13	25	8	0	3	18	15	5	6	93	19	10	4	3	5	32	15	4	1	90	15	13	4	2	3	28	15	6	4
Harrisville	N. E.	93	0	0	1	0	20	1	52	3	16	93	0	1	12	0	6	0	64	1	9	90	0	0	11	0	20	1	38	0	20
Thornville	B. & E.	92	0	0	6	2	13	3	21	26	21	93	0	4	14	3	19	2	12	17	22	90	0	0	6	5	17	3	30	7	22
Alma	C.	93	0	3	8	22	2	16	19	19	4	93	0	0	0	1	8	28	49	7	0	90	0	4	2	1	19	18	29	12	5
Lansing, S. B. of H.	C.	93	0	2	1	5	5	15	34	8	23	93	0	4	6	2	13	12	26	21	9	90	0	2	8	5	11	10	22	14	18
Ann Arbor	S. C.	93	3	10	3	3	1	20	26	15	12	93	5	12	1	2	5	8	38	11	11	90	1	6	8	6	7	11	33	6	12
Battle Creek	S. C.	93	2	5	7	4	8	13	27	20	7	93	1	3	4	6	9	16	13	34	7	90	0	7	3	9	9	18	8	29	7
Tecumseh	S. C.	......	......	....	....	....	....	..	....	....	....	......	......	....	....	....	....	..	....	....	....	89	1	6	10	7	14	7	15	8	21
Birmingham	S. E.	81	6	1	0	1	7	15	23	8	20	87	16	8	2	1	1	12	29	4	14	88	11	20	2	5	5	15	11	8	11

*† These foot-notes are at bottom of first page of this table.

Graphic representations of statements for eight lines in this table are given in Diagram XII, which is explained on page 62 of the annual report for 1898, and in preceding reports.

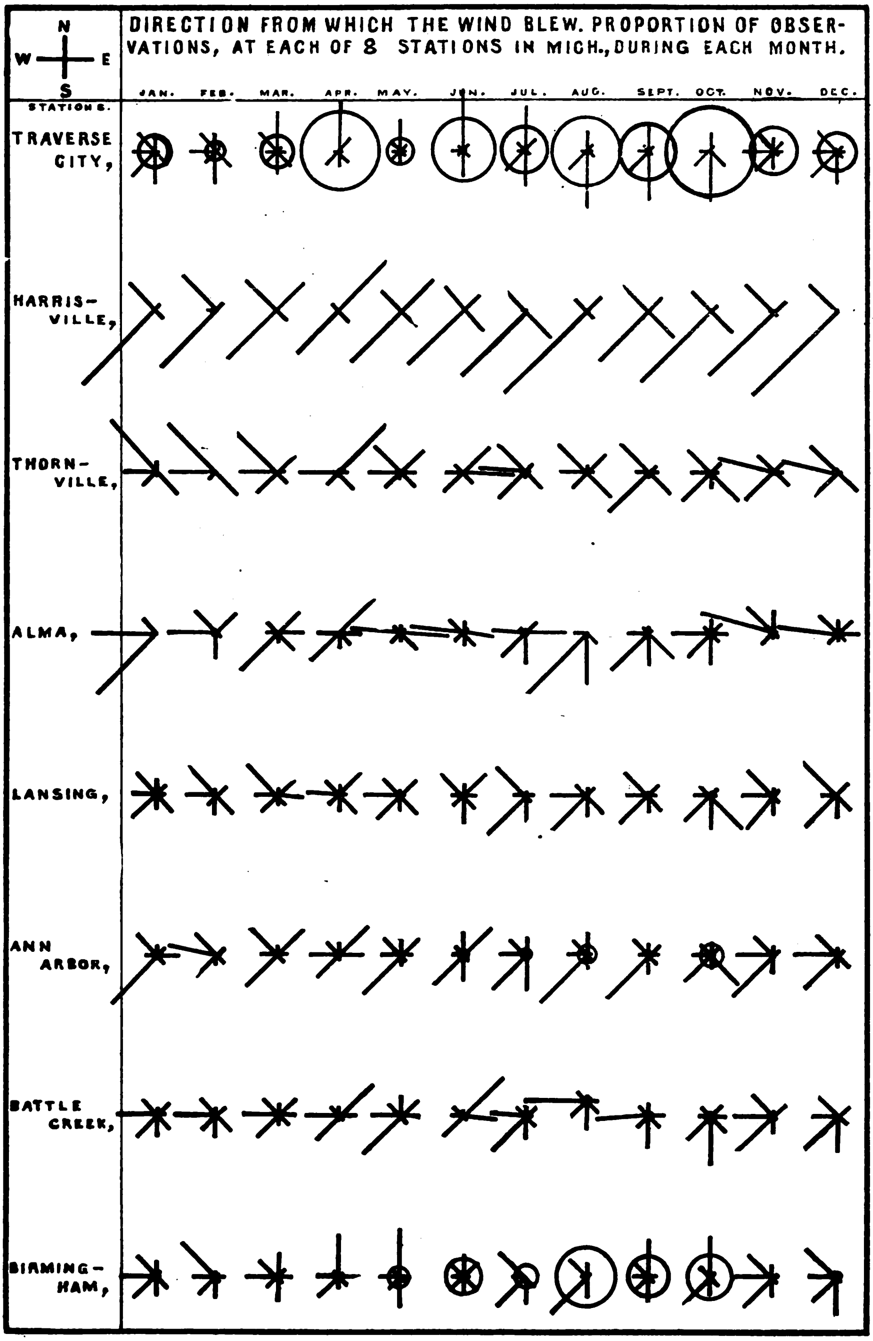
TABLE XL.—CONCLUDED.—*Direction of wind, months in 1900.—Observations at which the wind was blowing from direction named.*

Stations in Michigan.*	Divisions of the State.*	October.										November.										December.									
		Total.	Calm.	N.	N.E.	E.	S. E.	S.	S.W.	W.	N.W.	Total.	Calm.	N.	N.E.	E.	S. E.	S.	S.W.	W.	N.W.	Total.	Calm.	N.	N.E.	E.	S. E.	S.	S.W.	W.	N.W.
Av. 8 stations.†	....	93	6	6	6	4	15	15	24	9	9	90	2	5	6	2	5	7	26	22	17	92	2	2	5	3	7	10	26	18	19
Traverse City....	N. W.	93	24	9	3	1	11	28	11	5	1	90	13	7	7	5	4	10	15	17	12	93	11	2	4	4	5	18	20	14	15
Harrisville......	N. E.	93	0	0	5	0	16	1	55	1	15	90	0	0	10	0	5	0	51	2	22	93	0	0	4	0	1	0	66	1	21
Thornville	B. & E.	93	0	0	7	5	22	9	22	11	17	90	1	0	6	5	10	2	22	32	12	93	0	3	2	3	15	0	18	31	21
Alma	C.	93	0	8	8	9	6	17	18	22	5	90	0	13	1	0	3	2	9	41	21	93	0	7	10	12	6	4	7	34	13
Lansing, S. B. of H..........	C.	93	1	2	5	3	25	19	20	10	8	90	0	5	5	2	5	11	24	18	20	93	0	1	9	0	11	12	25	9	26
Ann Arbor.......	S. C.	92	6	7	7	2	23	8	21	10	8	90	1	5	4	0	2	11	32	21	14	93	1	4	5	0	9	8	25	25	16
Battle Creek	S. C.	93	3	0	8	8	13	28	19	7	7	90	0	2	9	0	3	10	28	22	16	93	0	1	8	1	6	20	27	14	16
Tecumseh........	S. C.	92	9	9	11	3	11	22	16	3	8	90	0	6	7	0	7	9	31	10	20	93	0	9	4	0	4	16	24	10	26
Birmingham	S. E.	90	12	22	3	2	7	11	22	2	9	89	1	7	3	1	4	11	23	21	18	85	3	0	1	0	3	20	19	16	23

*† These foot-notes are at bottom of first page of this table.

Diagram XII exhibits lines showing, by months, directions of wind at each of eight stations in this table; for each month and station the diagram represents the figures given in this table for the same month and stations; it is explained on page 62 of the annual report for 1898, and in preceding reports.

DIAGRAM XII.—WIND, DIRECTION, AT STATIONS, BY MONTHS, 1900.



[PLATE 1084]

TABLE XLI.—*Average daily range of atmospheric pressure (as determined from three daily observations) for months and year 1900, at 9 stations, also average line for 7 stations* in Michigan—stations arranged in order by latitude, those farthest north first.*

Stations in Michigan.*	Average daily range of barometer—Year and months, 1900.														
	Norm. †	1899.	1900.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
For 7 stations ‡.....	......	......	.190	.261	.280	.291	.186	.137	.169	.130	.082	.173	.148	.216	.205
Traverse City.......	19 .212	.192	.196	.252	.240	.303	.189	g .163	.175	.149	.078	b .200	.161	.222	.215
Alma........	......	......	¶	.....	.....	.354	.203	.....	.198	.141	.095	.186	.153	.114	.068
Harrisville..........	6 .208	.191	.199	.268	.272	.314	.186	.144	.181	.150	.081	.192	.159	.231	.206
Thornville..........	17 .210	.180	.191	.255	.281	.293	.185	.132	.190	.132	.084	.172	.157	.204	.203
Lansing, S. B. of H.	19 .203	.182	.190	.266	.286	.296	.179	.121	.167	.128	.085	.170	.143	.225	.218
Birmingham........	14 .212	.200	.221	d .313	e .354	c .288	.206	c .154	d .181	b .152	b .112	e .207	a .181	d .260	d .245
Battle Creek........	9 .140	.138	.141	.204	.221	.250	.178	.116	.131	.080	.052	.101	.093	.139	.132
Ann Arbor..........	19 .204	.181	.192	.268	.305	.296	.180	.131	.161	.122	.084	.166	.143	.231	.216
Tecumseh...........	......	.167	§	.216	.301	.304	.166	a .139	.....	.....	.....	.136	.132	.212	a .164

* The names of observers, their places of observation, and the counties in which these places are situated are stated in Table I. The average atmospheric pressure at each of these stations, by months, in 1900, is given in Table XLIV.

† Numbers in this column state the average daily range of atmospheric pressure for periods of years ending in each case with Dec. 31, 1900. The small figures above and at the right of numbers which state the average daily range denote the number of years included in the average.

‡ Not including Tecumseh and Alma.

¶ The average for 9 months is .168. § For 9 months, .197.

a For 30 days. b For 29 days. c For 28 days. d For 27 days. e For 26 days. f For 24 days. g For 18 days.

NOTE.—The latitude and elevations of some of the stations in Table XLI, are stated in Table II.

The daily range is found by subtracting the lowest observation from the highest observation, 7 A. M. to 7 A. M.

Foot-notes to Table XLII.

* Numbers in this column state the average monthly range of atmospheric pressure for a period of years ending in each case with December 31, 1900. The small figures above and at the right of the numbers which state the average denote the number of years included in the average.

† Represents the difference between the highest of 8 stations and the lowest of 8 stations for year and for each month of year, not including Tecumseh and Alma.

‡ Represents sum of ranges at 7 stations divided by 7.

§ The average for 9 months is .633. ||For 9 months, .891.

a, b, c. In the columns from January to December, inclusive, the letters a, b, c, etc., stand directly above the numbers from which they refer to the notes below.

a For 30 days. b For 29 days. c For 28 days. d For 27 days. e For 26 days. f For 25 days. g For 24 days. h For 18 days.

NOTE.—The statements in the (*) foot-note to Table XV, apply also to Table XVI.

TABLE XLII.—*Range of atmospheric pressure (as determined from three daily observations) for the year and for each month and for the average month of the year 1900, at 7 and at each of the 7 stations, and average line for 7 stations in Michigan; also the normal—average monthly range for a series of years. Stations named in order by latitude, those farthest North first.*

Stations in Michigan.	Range of barometer.—Year and months, 1900.															
	Norm. *	1899.	1900.	Av. Month.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
For 7 stations†	......	......	1.735	1.223	1.536	1.528	1.536	1.340	.941	1.023	.940	.929	1.222	.917	1.409	1.349
Av. for 7 stations‡.....	......	......	1.275	.813	.973	1.165	1.183	.778	.536	.619	.598	.456	.768	.587	1.075	1.017
Traverse City	19 .944	1.507	1.467	.874	.957	1.261	1.236	1.092	h .648	.678	.651	.468	b .533	.668	1.132	1.167
Alma.........	......	......	......	§	......	.....	.994	.893	.....	.685	.396	.494	.546	.541	.680	.466
Harrisville...	6 .902	1.412	1.332	.858	1.023	1.232	1.225	.772	.569	.641	.675	.425	.765	.627	1.221	1.121
Thornville...	17 .928	1.441	1.288	.823	.970	1.256	1.230	.697	.557	.616	.604	.619	.876	.595	.959	.900
Lansing, S. B. of H...	19 .894	1.258	1.286	.805	.974	1.119	1.209	.753	.299	.639	.604	.454	.855	.594	1.108	1.051
Birmingham.	14 .914	1.379	1.349	.886	d 1.089	e 1 261	c 1.345	.755	c .600	d ·627	b .674	a .492	d .919	a .686	c 1.168	c 1.013
Battle Creek.	2 .640	1.028	.956	.642	.817	f .917	g .861	.685	.503	.543	.401	.286	.619	.397	.832	.845
Ann Arbor...	19 .896	1.307	1.247	.802	.980	1.109	1.173	.691	.574	.590	.580	.445	.808	.545	1.104	1.019
Tecumseh....	*	1.340	......	‖	.972	1.131	1.158	.717	.609	.....	.....	.....	.761	.543	1.128	1.004

Foot-notes at bottom of page 52.

TABLE XLIII.—*Average atmospheric pressure, by year and months, in 1900, compared with annual and monthly averages for 1899, and for the 23 years, 1877-99.* These averages are for groups of several stations in Michigan.*

Years, etc.	Average atmospheric pressure.—Inches of mercury.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 23 years, 1877-99	29.132	29.147	29.147	29.127	29.123	29.092	29.097	29.112	29.130	29.172	29.155	29.146	29.140
1899 (9 stations)....	29.160	29.175	29.102	29.054	29.163	29.165	29.192	29.140	29.154	29.195	29.278	29.193	29.106
1900 (8 stations)....	29.154	29.106	29.080	29.169	29.190	29.119	29.127	29.123	29.181	29.202	29.253	29.147	29.150
In 1900 greater than av. for 23 years, 1877-99	.022	......	....	.042	.067	.027	.030	.011	.051	.030	.098	.001	.010
In 1900 less than av. for 23 years, 1877-99............	....	.041	.067	......	......	......	......	......	......	......	......	......	......
In 1900 greater than in 1899........	....	......	......	.115	.027	......	......	......	.027	.007	......	......	.004
In 1900 less than in 1899............	.006	.069	.022	......	......	.046	.065	.017	......	......	.025	.046	......

* At from 7 to 20 stations per year for the 22 years, 1877-98. Just which stations in each year, up to 1897, are shown on page 75, report for 1898.

TABLE XLIV.—*Average atmospheric pressure for months and year 1900, at each of 10 stations in Michigan; also averages for 8 stations; as indicated by the height, in inches, of Mercury in the barometer. Corrected for temperature.—Reduced to 32° F. (for some stations not corrected for instrumental errors*).—Average of observations made daily at 7 A. M., 2 P. M. and 9 P. M. by observers† for the State Board of Health.*

Stations in Michigan.†	Divisions of the State‡	Inches of Mercury—Atmospheric pressure.													
		Years.		Months, 1900.											
		Norm.§	1900.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 8 stations ¶	....	....	29.154	29.106	29.080	29.169	29.190	29.119	29.127	29.123	29.181	29.202	29.253	29.147	29.150
Traverse City	N. W.	29.323^{19}	29.325	29.281	29.294	29.345	29.367	[h] 29.297	29.293	29.276	29.344	[b] 29.364	29.401	29.329	29.312
Harrisville	N. E.	29.327^{6}	29.322	20.296	29.278	29.343	29.369	29.283	29.289	29.259	29.332	29.359	29.437	29.314	29.308
Thornville	B. & E.	28.956^{21}	28.952	28.762	[‖] 28.776	[**] 29.014	29.004	28.928	28.929	28.946	29.010	29.036	29.088	28.963	28.969
Alma	C.	....	††	....	....	29.353	29.239	....	29.168	29.143	29.214	29.280	29.271	29.491	29.083
Agricultural College	C.	29.081^{19}	29.086	29.072	29.034	29.091	29.110	29.032	29.051	29.051	29.106	29.138	29.182	29.080	29.080
Lansing, S. B. of H.	C.	$29\ 064^{22}$	29.083	29.050	29.012	29.074	29.101	29.041	29.043	29.053	29.121	29.143	29.187	29.082	29.083
Ann Arbor	S. C.	29.035^{20}	29.044	29.012	28.974	29.031	29.057	28.994	29.029	29.027	29.087	29.100	29.147	29.029	29.045
Battle Creek	S. C.	29.344^{2}	29.333	29.324	[f] 29.257	[g] 29.358	29.405	29.343	29.354	29.307	29.323	29.326	28.392	29.310	29.293
Tecumseh	S. C.	....	‡‡	29.138	29.079	29.135	29.165	29.099	....	....	....	29.208	29.262	29.148	29.155
Birmingham	S. E.	29.104^{14}	29.085	[d] 29.053	[e] 29.012	[c] 29.093	29.102	[c] 29.034	[d] 29.024	[b] 29.066	[a] 29.122	[d] 29.146	[a] 29.189	[c] 29.065	[c] 29.111

* A correction has been made for instrumental error of barometer at Ann Arbor; .004 has been added to each monthly average during the year 1900. At the Agricultural College, —.013 has been subtracted from each monthly average. For other stations the instrumental error of barometer is not known.

† The names of observers, their places of observation, and the counties in which these places are situated are stated in Table I.

‡ The full names of divisions and the counties in each division are stated in Exhibit I, in the annual report for 1898 and preceding reports.

§ Numbers in this column state the average annual atmospheric pressure for periods of years ending in each case with December 31, 1900. The small figures at the right of the numbers which state the average denote the number of years included in the average.

¶ This line is an average for eight stations, at which observations, nearly complete, were received for every month in the year. It does not include Tecumseh and Alma. Green's standard barometer was used at all the 10 stations for 1900.

‖ Observations with aneroid barometer for last five days in February.

** Observations with aneroid barometer from 7 a. m. March 1 to 7 a. m. March 22, inclusive.

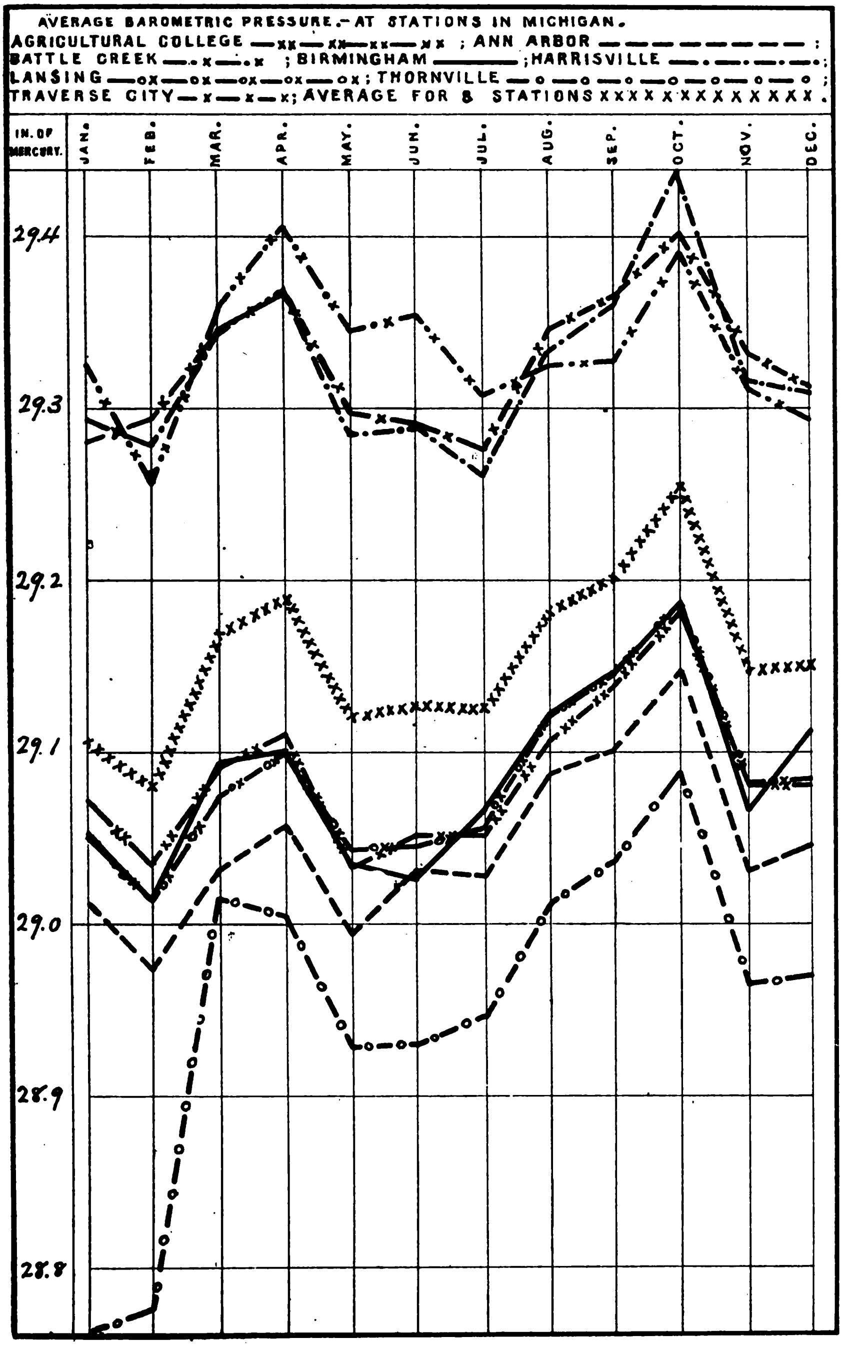
†† The average for 9 months is 29.249. ‡‡ For 9 months, 29.154.

NOTE.—Computations of monthly averages for the year 1900 were furnished by the observers at Ann Arbor and the Agricultural College. The remainder of the computations were made at the office of the State Board of Health.

a For 30 days. b For 29 days. c For 28 days. d For 27 days. e For 26 days. f For 25 days. g For 24 days. h For 18 days.

The average line and lines for eight stations in this table are graphically represented in Diagram XVI.

DIAGRAM XVI.—ATMOSPHERIC PRESSURE, BY MONTHS, 1900.



[PLATE 1087]

TABLE XLV.—*Average daily range of atmospheric pressure, by year and months, in 1900, compared with annual and monthly averages for 1899, and for the 18 years, 1882-99.* These averages are for groups of several stations in Michigan.*

Years, etc.	Average daily range of barometer.—Year and months, 1900.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 18 years, 1882-99	.209	.300	.293	.265	.211	.166	.136	.124	.131	.169	.204	.250	.266
1899 (8 stations)....	.179	.282	.212	.302	.136	.141	.140	.102	.110	.169	.144	.178	.229
1900 (7 stations)....	.190	.261	.280	.291	.186	.137	.169	.130	.082	.173	.148	.216	.205
In 1900 **greater** than av. for 18 years, 1882-99......	......	......	......	.026	......	......	.033	.006	......	.004	......	......	......
In 1900 **less** than av. for 18 years, 1882-99............	.019	.039	.013	.....	.025	.029	......	......	.049	......	.056	.034	.061
In 1900 **greater** than in 1899........	.011	......	.068	......	.050	......	.029	.028	......	.004	.004	.038	......
In 1900 **less** than in 1899............	....	.021	......	.011	......	.004	......	......	.028	......	......	......	.024

*** At from 8 to 18 stations per year for the seventeen years, 1882-98. Just which stations in each year, up to 1897, are shown on page 78, report for 1898.**

TABLE XLVI.—*Range of atmospheric pressure, by year and months, in 1900, compared with annual and monthly averages for 1899, and for the 18 years, 1882-99.* These averages are for groups of several stations in Michigan.*

Years, etc.	Range of barometer.—Year and months, 1900.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 18 years, 1882-99.	.942	1.269	1.268	1.115	1.014	.788	.693	.573	.603	.801	.982	1.095	1.128
1899 (8 stations).....	.802	1.245	1.105	.974	.719	.647	.517	.387	.540	.706	.698	.965	1.117
1900 (7 stations).. ..	.813	.973	1.165	1.183	.778	.536	.619	.598	.456	.768	.587	1.075	1.017
In 1900 **greater** than av. for 18 years, 1882-99......	......	......	......	.068	......	......	......	.025	......	......	......	......	......
In 1900 **less** than av. for 18 years, 1882-99..................	.129	.296	.103	......	.236	.252	.074	......	.147	.033	.395	.020	.111
In 1900 **greater** than in 1899.......	.011	......	.060	.209	.059	......	.102	.211	......	.062	......	.110	......
In 1900 **less** than in 1899...............	....	.272	......	......	......	.111	......	......	.084	......	.111	......	.100

*** At from 8 to 18 stations per year for the seventeen years, 1882-98. Just which stations in each year, up to 1897, are shown on page 78, report for 1898.**

Sunshine and clouds.—On the back of each blank register supplied by this Board to observers, on which they are to register meteorological data, is a statement that "One observer has reported a record of days 'all or nearly all cloudy' and days 'all or nearly all sunshine.' The State Board of Health would be glad to have such a report from all observers who can conveniently make it. Memoranda may be made in a column headed 'cloudy or sunny,' days more than eighty per cent of clouds being marked with the abbreviation 'C,' indicating *cloudy,* and days with less than 20 per cent of clouds with an 'S,' indicating *sunshine.*"

TABLE XLVII.—*Statements of the number of days in each month which were reported "sunny," "partly cloudy," and "cloudy," by observers at stations in Michigan.*

Stations in Michigan.	1900.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Marquette........	S.	10	3	4	10	5	10	8	8	4	6	0	0
	P. C.	6	9	11	8	13	13	9	15	14	14	7	7
	C.	24	16	16	12	13	7	13	8	12	11	23	24
Sault Ste. Marie..	S.	4	9	12	11	15	16	17	8	6	8	2	3
	P. C.	7	6	14	11	11	6	3	15	13	9	4	4
	C.	20	13	5	8	5	8	11	8	11	14	24	24
Traverse City....	S.	1	1	11	......	13	16	11	12	7	12	2	2
	P. C.	7	9	11	......	9	8	4	10	10	7	4	4
	C.	23	18	9	......	9	6	16	9	13	12	24	25
Alpena............	S.	3	4	11	14	8	17	11	12	10	11	3	3
	P. C.	3	8	5	8	12	6	7	6	6	8	7	3
	C.	25	16	15	8	11	7	13	13	14	12	20	25
Grand Haven....	S.	......	1	3	12	11	17	12	14	11	10	6	3
	P. C.	......	6	10	12	10	9	11	11	13	13	5	8
	C.	......	21	18	6	10	4	8	6	6	8	19	20
Port Huron......	S.	6	10	9	12	5	11	11	10	12	11	7	5
	P. C.	11	9	7	4	7	14	16	15	14	13	7	11
	C.	14	9	15	14	19	5	4	6	4	7	16	15
Thornville	S.	4	12	12	16	11	21	18	20	20	17	4	7
	P. C.	4	7	9	7	8	7	8	9	7	7	5	11
	C.	23	9	10	7	12	2	5	2	3	7	21	13
Lansing..........	S.	3	5	9	12	6	18	9	12	11	13	6	5
	P. C.	5	4	7	4	10	4	9	4	7	6	2	7
	C.	23	19	15	14	15	8	13	15	12	12	22	19
Ann Arbor.......	S.	3	7	9	14	10	21	16	15	17	7	2	3
	P. C.	14	9	7	8	9	5	12	10	6	13	8	10
	C.	14	12	15	8	12	4	3	6	7	11	20	18
Battle Creek.....	S.	4	2	9	21	21	25	25	19	23	21	5	9
	P. C.	0	0	0	0	0	0	0	0	0	1	2	3
	C.	27	23	22	9	10	5	6	12	7	9	23	19
Detroit	S.	2	3	6	9	6	12	9	12	10	12	5	7
	P. C.	10	10	9	12	12	12	15	12	15	13	4	7
	C.	19	15	16	9	13	6	7	7	5	6	21	17

TABLE XLV.—*Average daily range of atmospheric pressure, by year and months, in 1900, compared with annual and monthly averages for 1899, and for the 18 years, 1882-99.* These averages are for groups of several stations in Michigan.*

Years, etc.	Average daily range of barometer.—Year and months, 1900.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 18 years, 1882-99	.209	.300	.293	.265	.211	.166	.136	.124	.131	.169	.204	.250	.266
1899 (8 stations)….	.179	.282	.212	.302	.136	.141	.140	.102	.110	.169	.144	.178	.229
1900 (7 stations)….	.190	.261	.280	.291	.186	.137	.169	.130	.082	.173	.148	.216	.205
In 1900 **greater** than av. for 18 years, 1882-99……	……	……	……	.026	……	……	.033	.006	……	.004	……	……	……
In 1900 **less** than av. for 18 years, 1882-99…………	.019	.039	.013	……	.025	.029	……	……	.049	……	.056	.034	.061
In 1900 **greater** than in 1899……..	.011	……	.068	……	.050	……	.029	.028	……	.004	.004	.038	……
In 1900 **less** than in 1899…………	……	.021	……	.011	……	.004	……	……	.028	……	……	……	.024

* At from 8 to 18 stations per year for the seventeen years, 1882-98. Just which stations in each year, up to 1897, are shown on page 78, report for 1898.

TABLE XLVI.—*Range of atmospheric pressure, by year and months, in 1900, compared with annual and monthly averages for 1899, and for the 18 years, 1882-99.* These averages are for groups of several stations in Michigan.*

Years, etc.	Range of barometer.—Year and months, 1900.												
	Annual av.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 18 years, 1882-99.	.942	1.269	1.268	1.115	1.014	.788	.693	.573	.603	.801	.982	1.095	1.128
1899 (8 stations)…..	.802	1.245	1.105	.974	.719	.647	.517	.387	.540	.706	.698	.965	1.117
1900 (7 stations).. ..	.813	.973	1.165	1.183	.778	.536	.619	.598	.456	.768	.587	1.075	1.017
In 1900 **greater** than av. for 18 years, 1882-99……	……	……	……	.068	……	……	……	.025	……	……	……	……	……
In 1900 **less** than av. for 18 years, 1882-99………………	.129	.296	.103	……	.236	.252	.074	……	.147	.033	.395	.020	.111
In 1900 **greater** than in 1899…….	.011	……	.060	.209	.059	……	.102	.211	……	.062	……	.110	……
In 1900 **less** than in 1899……………	……	.272	……	……	……	.111	……	……	.084	……	.111	……	.100

* At from 8 to 18 stations per year for the seventeen years, 1882-98. Just which stations in each year, up to 1897, are shown on page 78, report for 1898.

Sunshine and clouds.—On the back of each blank register supplied by this Board to observers, on which they are to register meteorological data, is a statement that "One observer has reported a record of days 'all or nearly all cloudy' and days 'all or nearly all sunshine.' The State Board of Health would be glad to have such a report from all observers who can conveniently make it. Memoranda may be made in a column headed 'cloudy or sunny,' days more than eighty per cent of clouds being marked with the abbreviation 'C,' indicating *cloudy,* and days with less than 20 per cent of clouds with an 'S,' indicating *sunshine.*"

TABLE XLVII.—*Statements of the number of days in each month which were reported "sunny," "partly cloudy," and "cloudy," by observers at stations in Michigan.*

Stations in Michigan.	1900.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Marquette........	S.	10	3	4	10	5	10	8	8	4	6	0	0
	P. C.	6	9	11	8	13	13	9	15	14	14	7	7
	C.	24	16	16	12	13	7	13	8	12	11	23	24
Sault Ste. Marie..	S.	4	9	12	11	15	16	17	8	6	8	2	3
	P. C.	7	6	14	11	11	6	3	15	13	9	4	4
	C.	20	13	5	8	5	8	11	8	11	14	24	24
Traverse City....	S.	1	1	11	......	13	16	11	12	7	12	2	2
	P. C.	7	9	11	......	9	8	4	10	10	7	4	4
	C.	23	18	9	......	9	6	16	9	13	12	24	25
Alpena...........	S.	3	4	11	14	8	17	11	12	10	11	3	3
	P. C.	3	8	5	8	12	6	7	6	6	8	7	3
	C.	25	16	15	8	11	7	13	13	14	12	20	25
Grand Haven....	S.	......	1	3	12	11	17	12	14	11	10	6	3
	P. C.	......	6	10	12	10	9	11	11	13	13	5	8
	C.	......	21	18	6	10	4	8	6	6	8	19	20
Port Huron......	S.	6	10	9	12	5	11	11	10	12	11	7	5
	P. C.	11	9	7	4	7	14	16	15	14	13	7	11
	C.	14	9	15	14	19	5	4	6	4	7	16	15
Thornville	S.	4	12	12	16	11	21	18	20	20	17	4	7
	P. C.	4	7	9	7	8	7	8	9	7	7	5	11
	C.	23	9	10	7	12	2	5	2	3	7	21	13
Lansing..........	S.	3	5	9	12	6	18	9	12	11	13	6	5
	P. C.	5	4	7	4	10	4	9	4	7	6	2	7
	C.	23	19	15	14	15	8	13	15	12	12	22	19
Ann Arbor.......	S.	3	7	9	14	10	21	16	15	17	7	2	3
	P. C.	14	9	7	8	9	5	12	10	6	13	8	10
	C.	14	12	15	8	12	4	3	6	7	11	20	18
Battle Creek.....	S.	4	2	9	21	21	25	25	19	23	21	5	9
	P. C.	0	0	0	0	0	0	0	0	0	1	2	3
	C.	27	23	22	9	10	5	6	12	7	9	23	19
Detroit	S.	2	3	6	9	6	12	9	12	10	12	5	7
	P. C.	10	10	9	12	12	12	15	12	15	13	4	7
	C.	19	15	16	9	13	6	7	7	5	6	21	17

TABLE XLIV.—*Average atmospheric pressure for months and year 1900, at each of 10 stations in Michigan; also averages for 8 stations; as indicated by the height, in inches, of Mercury in the barometer. Corrected for temperature.—Reduced to 32° F. (for some stations not corrected for instrumental errors*).—Average of observations made daily at 7 A. M., 2 P. M. and 9 P. M. by observers† for the State Board of Health.*

Stations in Michigan.†	Divisions of the State‡	Inches of Mercury—Atmospheric pressure.													
		Years.		Months, 1900.											
		Norm.§	1900.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 8 stations ¶	....	....	29.154	29.106	29.080	29.169	29.190	29.119	29.127	29.123	29.181	29.202	29.253	29.147	29.150
Traverse City	N. W.	29.323^{19}	29.325	29.281	29.294	29.345	29.367	[h] 29.297	29.293	29.276	29.344	[b] 29.364	29.401	29.329	29.312
Harrisville	N. E.	29.327^{6}	29.322	20.296	29.278	29.343	29.369	29.283	29.289	29.259	29.332	29.359	29.437	29.314	29.308
Thornville	B. & E.	28.956^{21}	28.952	28.762	‖ 28.776	** 29.014	29.004	28.928	28.929	28.946	29.010	29.036	29.088	28.963	28.969
Alma	C.	....	††	....	....	29.353	29.239	....	29.168	29.143	29.214	29.280	29.271	29.491	29.083
Agricultural College	C.	29.081^{19}	29.086	29.072	29.034	29.091	29.110	29.032	29.051	29.051	29.106	29.138	29.182	29.080	29.080
Lansing, S. B. of H	C.	29 064^{22}	29.083	29.050	29.012	29.074	29.101	29.041	29.043	29.053	29.121	29.143	29.187	29.082	29.083
Ann Arbor	S. C.	29.035^{20}	29.044	29.012	28.974	29.031	29.057	28.994	29.029	29.027	29.087	29.100	29.147	29.029	29.045
Battle Creek	S. C.	29.344^{2}	29.333	29.324	[f] 29.257	[g] 29.358	29.405	29.343	29.354	29.307	29.323	29.326	28.392	29.310	29.293
Tecumseh	S. C.	....	‡‡	29.138	29.079	29.135	29.165	29.099	....	....	....	29.208	29.262	29.148	29.155
Birmingham	S. E.	29.104^{14}	29.085	[d] 29.053	[e] 29.012	[c] 29.093	29.102	[c] 29.034	[d] 29.024	[b] 29.066	[a] 29.122	[d] 29.146	[a] 29.189	[c] 29.065	[c] 29.111

* A correction has been made for instrumental error of barometer at Ann Arbor; .004 has been added to each monthly average during the year 1900. At the Agricultural College, —.013 has been subtracted from each monthly average. For other stations the instrumental error of barometer is not known.

† The names of observers, their places of observation, and the counties in which these places are situated are stated in Table I.

‡ The full names of divisions and the counties in each division are stated in Exhibit I, in the annual report for 1898 and preceding reports.

§ Numbers in this column state the average annual atmospheric pressure for periods of years ending in each case with December 31, 1900. The small figures at the right of the numbers which state the average denote the number of years included in the average.

¶ This line is an average for eight stations, at which observations, nearly complete, were received for every month in the year. It does not include Tecumseh and Alma. Green's standard barometer was used at all the 10 stations for 1900.

‖ Observations with aneroid barometer for last five days in February.

** Observations with aneroid barometer from 7 a. m. March 1 to 7 a. m. March 22, inclusive.

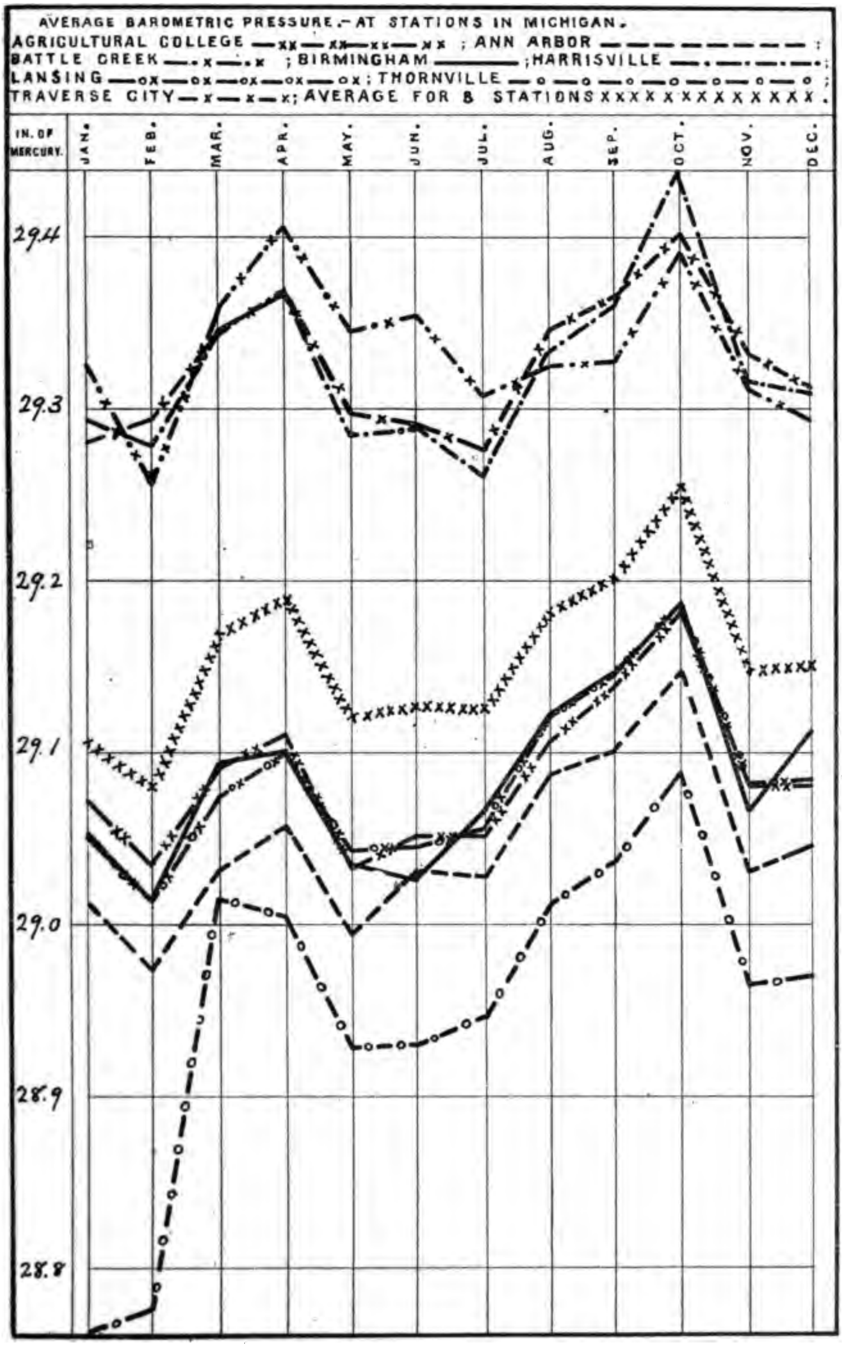
†† The average for 9 months is 29.249. ‡‡ For 9 months, 29.154.

NOTE.—Computations of monthly averages for the year 1900 were furnished by the observers at Ann Arbor and the Agricultural College. The remainder of the computations were made at the office of the State Board of Health.

a For 30 days. b For 29 days. c For 28 days. d For 27 days. e For 26 days. f For 25 days. g For 24 days. h For 18 days.

The average line and lines for eight stations in this table are graphically represented in Diagram XVI.

DIAGRAM XVI.—ATMOSPHERIC PRESSURE, BY MONTHS, 1900.



[PLATE 1087]

THE TIME OF GREATEST PREVALENCE OF EACH DISEASE.

CONTRIBUTIONS TO THE STUDY OF THE CAUSES OF SICKNESS.

A STATISTICAL REPORT BASED ON WEEKLY POSTAL-CARD REPORTS OF SICKNESS IN MICHIGAN DURING THE YEAR 1900, AND COMPARISONS WITH PRECEDING YEARS.

COMPILED UNDER THE DIRECTION OF THE SECRETARY OF THE STATE BOARD OF HEALTH.

This paper is the twenty-fourth in a series of articles upon the same general subject begun in the latter part of 1876. It presents a summary of the compilation of weekly reports of sickness in Michigan in 1900. It includes a series of graphic illustrations which show by months, in 1900, the rise and fall of twenty-eight of the most prominent diseases in Michigan.

One of the objects of this compilation is to learn the time of the greatest and of the least prevalence of each of the more important diseases in the State, and to note the connection of this prevalence with each of the meteorological conditions in the State.

Tables are given showing the per cent of the weekly *reports* and the per cent of *observers* which stated the presence of the various diseases; and by comparing Table 1 with Table 4, we see the correspondence in the two lines of evidence,—that of the "prevalence" of the diseases as shown by the per cent of *reports,* and the "area of prevalence" as shown by the per cent of *observers,* the diseases following each other in a somewhat similar order from highest to lowest—the diseases being arranged in each table in the order of their greatest reported prevalence in 1900.

For purposes of comparison of the sickness from the several diseases in the year under consideration with that in preceding years, some of the tables exhibit the facts relative to the sickness in Michigan from each of the important diseases in each of several preceding years, and some of the tables permit of quantitative comparisons of the latest year with the averages of the ten preceding years.

Propositions are stated as to the relations of specified meteorological conditions, and diseases are mentioned under these propositions in such manner as to suggest one method of studying some of the facts brought out in the compilation. Casual observation shows that certain diseases are much more prevalent in the hot months, while certain other diseases are much more prevalent in the cold months. The relation between these diseases and the atmospheric temperature is well marked, but accurate statistics are needed to show just what that relation is. We find, also, that other meteorological conditions than atmospheric temperature have a marked effect upon many of the diseases, apparently diminishing the effect of temperature in some instances, increasing its effect in other instances. For these reasons the State Board of Health undertakes, by a compilation of the weekly reports of sickness in connection with the various meteorological conditions, to learn what constant, and, therefore, probably causal relations exist between the humidity of the air, the ozone, the velocity of the wind, the atmospheric pressure, etc., and the increased or diminished prevalence of each disease in certain months as compared with other months in the same year, or with the same month in other years or series of years.

To facilitate the study of the causes of sickness and deaths, the State is divided into eleven geographical divisions, the counties in each of which were indicated by lines on maps of the State, on pages 201 and 217 of the report of this Board for 1886.

Physicians should have compensation for weekly reports of sickness.—Great credit is due the busy medical practitioners in Michigan who forward these reports of sickness. Some of them have made the reports regularly since this plan was adopted in 1876. The service is, as a rule, without compensation; a few health officers have slight pay from their local boards of health. Each one should have full compensation. No other class of persons has knowledge of the facts that are necessary in the compilation of health statistics; and it is greatly to the credit of physicians that they are so willing to coöperate in every effort made to advance the public health.

Plan of the weekly card reports.—The plan of the weekly reports remains the same as last year. (Cards having *pleuritis* printed on them were first used for weekly reports in October, 1887.) Observers now report only the diseases under their own personal observation. Previous to the year 1885, some of the observers reported such diseases as they believed to be present in their locality, even though not under their own observation. Details of the method of securing and the plan of marking these reports may be thus stated:—

> **The blanks for the weekly reports are printed on postal cards, which are supplied to the observers of diseases. Blank record books in which to preserve copies of the reports, remarks, etc., are also supplied to these observers, to be retained by them. The reports are forwarded weekly to the Secretary of the State Board of Health at Lansing.**
>
> **The plan of making the report is as follows: Each observer is requested to mark the disease of which there was the greatest number of cases under his observation during the week for which the report is made, 1; that of which there was the next greatest number of cases, 2; the next, 3; and so on, applying *consecutive* numbers to the diseases reported present; but marking with the *same* figure all diseases of which there is the same number of cases; to write 0 opposite each disease mentioned of which there was no case; to apply these numbers without regard to the severity of the cases; to include all cases, without regard to when they were taken sick, so long as they are actually sick with the given disease; to include all cases "under the observation" of the observer. A blank is left on the card for the convenience of those observers who prefer to state the number of cases rather than the order of prevalence by the foregoing method.**
>
> **To illustrate the method of making the reports, the following copy of one of the blanks now in use is given, correctly marked, in the "prevalence" column, for the number of cases stated on the right-hand margin. It should be remembered that the numbers in the "prevalence" column denote simply the relative order in which the several diseases appear to be prevalent, and do not denote a definite number of cases; so that a disease might one week be marked 4, and the following week, with the same number of cases, be marked 1. Names of diseases printed in italics are not *printed* on the postal blanks, but are supposed to have been *written* on the report by the observer.**

[Ed. 47] **REPORT of diseases under the observation of representive physicians in active general practice.**

Diseases in..and vicinity,

week ending Sat.,..., *190*......

DISEASES.	CASES OBSERVED. Order. a	No. of Cases.
Brain, Inflammation of......	*14*	*1*
Bowels, Inflammation of....	*12*	*3*
Bronchitis....................	*11*	*4*
Cerebro-Spinal Meningitis...	[illegible]	*0*
Cholera Infantum...........	*8*	*9*
Cholera Morbus..............	*10*	*6*
Consumption, Pulmonary...	*10*	*6*
Croup, Membranous.........	*12*	*3*
Diphtheria....................	*5*	*14*
Diarrhea......................	*3*	*17*
Dysentery.....................	*8*	*9*
Erysipelas....................	*13*	*2*
Fever, Intermittent.........	*2*	*21*
Fever, Remittent............	*11*	*4*
Fever, Typhoid (Enteric)....	*0*	*0*
Fever, Typho-malarial.......	*9*	*7*
Influenza......................	*7*	*11*
Kidney, Inflammation of....	*14*	*1*
Measles........................	*1*	*27*
Neuralgia.....................	*14*	*1*
Pleuritis......................	*0*	*0*
Pneumonia...................	*9*	*7*
Puerperal Fever.............	*0*	*0*
Rheumatism..................	*6*	*12*
Scarlet Fever................	*4*	*16*
Smallpox.....................	*0*	*0*
Tonsillitis....................	*11*	*4*
Whooping-cough............	*0*	*0*
Mumps......................	*6*	*12*
Dyspepsia..................	*11*	*4*

a. If you do not state the number of cases, please mark the disease of which there is the greatest number of cases, 1, in the order column; the disease having next greatest number of cases, 2; the next, 3; and so on for each disease, writing the same figures opposite diseases having the same number of cases. Write 0 opposite each disease of which there is no case under your observation. [Full statement of plan on second, third, and fourth pages of record-book cover.] A blank indicates that the item has been overlooked. Please mail this **signed** and **dated**, as soon as convenient after close of week.

NOTICE!—If this report includes a communicable disease, **please write, below, the township, city, or village in which the disease is.**

REMARKS:

.... *M. D.*

Bulletins of "Health in Michigan."—During the year 1900 the issue of the weekly and monthly bulletins of "Health in Michigan" has been continued. These bulletins are compiled from the regular weekly card reports of physicians in all parts of the State, and from the health officers' reports of communicable diseases, which reports, excepting those weekly card reports made by voluntary observers, are made to the Secretary of the State Board of Health in compliance with law.

The bulletins give to the members of the State Board of Health, local health officers, and when published to the public, information concerning the "diseases which cause most sickness" in the State, the relative amount of sickness from each disease, and comparisons with the preceding week or month, thus showing any sudden increase or decrease which may have occurred in the prevalence of any disease, together with a comparison of the various meteorological conditions; also (in the monthly bulletin) a comparison with the average month for a series of years; also (in the weekly bulletin) lists of the localities in which each of the dangerous communicable diseases is reported present, which lists, if widely published, would serve to put people intending to visit such places on their guard against such diseases. These lists were not published by the newspapers and other publications to which the weekly bulletins were sent, and the names of localities, excepting those from which smallpox was reported, were left out of the bulletins, commencing with August 25, 1900.

As a rule, about five-eighths of the card reports reach the office of the State Board of Health in time for compilation in the weekly bulletin, and the monthly bulletins are compiled from the information used in the weekly bulletins. It is found that the statements made in the monthly bulletins are corroborated by the information, after the close of the year, from the compilation of the whole number of the reports for the corresponding months of the year.

The bulletins are an immediate ephemeral use of some of the data supplied by the reports from localities, which data finally go to make up the permanently-valuable sickness statistics, and the communicable-disease statistics in Michigan; but even this ephemeral use has been the means of disseminating among the people of Michigan much information useful for the restriction and prevention of sickness and deaths.

A copy of the weekly bulletin has been sent to such editors as have expressed a desire to have it for use, entire or in part, in their papers; and copies of the monthly bulletin have been sent to the sanitary and medical journals which are received as exchanges by the library of the State Board of Health.

There are about 1,589 cities, villages and townships in Michigan, each of which is required by law to have a health officer, and nearly every one of them contributes some fact, and some of them very many facts, useful for the promotion of the public health. The State Board of Health serves to collect these facts, group them so as to make them most useful, and give them all out again to every locality for the general good.

Annual compilation of the weekly reports.—The reports from each locality are compiled by months. The average of the numbers stating the order of prevalence of the several diseases for the month is considered an indication of the actual order of prevalence of the diseases for that time. There is also found for each locality what per cent of the reports states the presence of each disease for the given month. This per cent of reports for a single locality indicates what portion of the month the disease was present in that locality. It may also be called the per cent of weeks the disease was present. These first results of the compilation are stated in Table 3, which, on account of the space required, has not been printed in the reports since that of 1882, but is preserved in the office of the State Board for reference and study.

A combination of the statements for localities in Table 3 is made by months for the State, so far as it is represented by the localities from which reports are received, showing: (1) What per cent of the observers reported each disease each month; (2) for the localities at which a given disease was reported, an average of the per cent of weeks it was reported at those localities; (3) what per cent of all the reports received for the month stated the presence of each disease; (4) an average of the numbers denoting the order of prevalence of each disease at the localities at which it was reported present during the month.

Diseases from which there was a marked increase or decrease in prevalence in Michigan in 1900.—By referring to Tables 13 and 14, on subsequent pages, it will be seen that the diseases which showed a marked increase in 1900 over the average for the ten years, 1890-99, are scarlet fever, smallpox, typhoid fever, and measles; the diseases in which the decrease in 1900 appears most marked, when compared with the above-mentioned average, are intermittent fever, remittent fever, pneumonia, typho-malarial fever, diphtheria, consumption, erysipelas, whooping-cough, membranous croup, puerperal fever, and inflammation of brain.

The lessened prevalence, in recent years, of some of the dangerous communicable diseases, as shown in the diagrams on pages 3 and 4 of this report, is undoubtedly due to the persistent efforts of the State Board of Health, with the coöperation of local health officers in the State, for the education of the people in the prompt and thorough isolation of infected persons and those who may have been exposed to a dangerous communicable disease, and the subsequent disinfection, after recovery, or death, of all infected articles.

Method of comparison of diseases by years, months, and weeks.—In the annual reports ending with that for 1888, mention was made of diseases in which a difference of seven or more was shown between the per cents of reports stating the presence of the disease in the current year and in the preceding year or term of years; in the reports since that for 1888 those diseases were mentioned of which the comparison showed an increase or decrease of twenty-five per cent from the preceding year, or from the normal, as the case may be.

In this report, those diseases which are reported by seven or more observers, and which show an increase or decrease of twenty-five per cent are generally mentioned, except in cases of cholera, smallpox, typhus fever or other particularly interesting or dangerous disease, and these are specially considered in each instance.

TABLE 1.—*Stating, for each of 11 years, 1890-1900, the number of reports received, and on what per cent of these reports each of 28 diseases was stated to be present; also an average for the period of 10 years, 1890-99. The diseases are arranged in the order of greatest area of prevalence in 1900. (Continued for each month of 1899 and 1900 on the two pages following.)*

Line number.	Diseases.	What per cent of the reports stated the presence of the disease.											
		Av. 1890-99.	1900.	1899.	1898.	1897.	1896.	1895.	1894.	1893.	1892.	1891.	1890.
	Av. Disease*	20	18	17	17	18	18	20	20	20	21	25	25
1	Rheumatism	64	63	63	62	66	60	60	62	64	64	69	71
2	Neuralgia	59	56	56	54	58	54	56	56	57	61	66	67
3	Bronchitis	53	49	50	49	50	51	52	50	53	54	60	65
4	Tonsillitis	45	45	42	40	43	45	43	42	49	48	49	50
5	Diarrhea	40	40	37	36	34	34	42	40	40	43	47	44
6	Influenza	46	40	42	45	47	44	44	41	43	42	55	53
7	Consumption, pul	33	25	22	20	20	23	29	36	38	38	49	52
8	Inflam. of kidney	19	20	19	17	17	16	20	17	17	21	20	21
9	Pleuritis	17	16	16	15	18	16	17	13	14	18	21	19
10	Intermittent fever	25	16	17	19	17	19	22	24	24	27	36	41
11	Pneumonia	22	16	17	17	19	18	21	20	22	25	27	30
12	Typhoid fever (ent.)	10	15	9	8	7	10	13	11	9	9	11	8
13	Cholera morbus	13	14	10	12	10	11	15	14	14	15	16	15
14	Dysentery	14	14	13	12	12	11	15	14	13	15	16	16
15	Measles	8	13	6	7	13	7	4	6	7	4	10	12
16	Cholera infantum	10	12	8	8	8	8	12	12	10	11	13	10
17	Scarlet fever	9	12	8	5	4	8	12	14	10	12	9	10
18	Remittent fever	19	11	12	13	11	16	20	20	18	21	28	27
19	Inflam. of bowels	12	11	10	10	10	10	11	13	12	13	15	14
20	Erysipelas	14	10	10	12	14	12	13	13	14	16	19	21
21	Whooping-cough	8	5	4	5	4	7	9	12	9	10	9	9
22	Diphtheria	6	4	3	3	5	5	5	7	7	7	6	8
23	Typho-mal. fever	4	3	1	2	0.9	2	4	4	4	5	6	7
24	Puerperal fever	3	2	2	2	2	2	2	2	3	4	3	4
25	Cerebro-spinal men	2	1	3	2	1	1	0.8	1	2	2	3	3
26	Inflam. of brain	3	1	2	2	2	3	3	3	3	3	4	5
27	Smallpox	0.6	1	0.4	.04	.05	4	0.3	0.6	0.3	.02	0	0.1
28	Membran. croup	2	0.4	0.6	0.5	0.7	1	2	2	2	3	4	4
	No. of reports received	†4,903	5,513	5,126	5,219	4,418	3,940	4,395	5,572	5,853	5,281	4,291	4,939

---

* The numbers opposite the names of the diseases do not state what per cent of the whole number of reports for the year stated the disease to be present at some time during the year, but state (on an average for twelve months of the year) what per cent of reports for the several months stated the disease to be present in those months. The column for each year is thus a statement for an average month of that year. On the two following pages of this table, however, the columns for each month state what per cent of the reports for that month (the number of which is stated at the foot of the column) stated the given disease to be present in that month.

† Average per year.

denoting the order of prevalence of each disease at the localities at which it was reported present during the month.

Diseases from which there was a marked increase or decrease in prevalence in Michigan in 1900.—By referring to Tables 13 and 14, on subsequent pages, it will be seen that the diseases which showed a marked increase in 1900 over the average for the ten years, 1890-99, are scarlet fever, smallpox, typhoid fever, and measles; the diseases in which the decrease in 1900 appears most marked, when compared with the above-mentioned average, are intermittent fever, remittent fever, pneumonia, typho-malarial fever, diphtheria, consumption, erysipelas, whooping-cough, membranous croup, puerperal fever, and inflammation of brain.

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Method of comparison of diseases by years, months, and weeks.—In the annual reports ending with that for 1888, mention was made of diseases in which a difference of seven or more was shown between the per cents of reports stating the presence of the disease in the current year and in the preceding year or term of years; in the reports since that for 1888 those diseases were mentioned of which the comparison showed an increase or decrease of twenty-five per cent from the preceding year, or from the normal, as the case may be.

In this report, those diseases which are reported by seven or more observers, and which show an increase or decrease of twenty-five per cent are generally mentioned, except in cases of cholera, smallpox, typhus fever or other particularly interesting or dangerous disease, and these are specially considered in each instance.

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Line number.	Diseases.	What per cent of the reports stated the presence of the disease.											
		Av. 1890-99.	1900.	1899.	1898.	1897.	1896.	1895.	1894.	1893.	1892.	1891.	1890.
	Av. Disease*	20	18	17	17	18	18	20	20	20	21	25	25
1	Rheumatism	64	63	63	62	66	60	60	62	64	64	69	71
2	Neuralgia	59	56	56	54	58	54	56	56	57	61	66	67
3	Bronchitis	53	49	50	49	50	51	52	50	53	54	60	65
4	Tonsillitis	45	45	42	40	43	45	43	42	49	48	49	50
5	Diarrhea	40	40	37	36	34	34	42	40	40	43	47	44
6	Influenza	46	40	42	45	47	44	44	41	43	42	55	53
7	Consumption, pul	33	25	22	20	20	23	29	36	38	38	49	52
8	Inflam. of kidney	19	20	19	17	17	16	20	17	17	21	20	21
9	Pleuritis	17	16	16	15	18	16	17	13	14	18	21	19
10	Intermittent fever	25	16	17	19	17	19	22	24	24	27	36	41
11	Pneumonia	22	16	17	17	19	18	21	20	22	25	27	30
12	Typhoid fever (ent.)	10	15	9	8	7	10	13	11	9	9	11	8
13	Cholera morbus	13	14	10	12	10	11	15	14	14	15	16	15
14	Dysentery	14	14	13	12	12	11	15	14	13	15	16	16
15	Measles	8	13	6	7	13	7	4	6	7	4	10	12
16	Cholera infantum	10	12	8	8	8	8	12	12	10	11	13	10
17	Scarlet fever	9	12	8	5	4	8	12	14	10	12	9	10
18	Remittent fever	19	11	12	13	11	16	20	20	18	21	28	27
19	Inflam. of bowels	12	11	10	10	10	10	11	13	12	13	15	14
20	Erysipelas	14	10	10	12	14	12	13	13	14	16	19	21
21	Whooping-cough	8	5	4	5	4	7	9	12	9	10	9	9
22	Diphtheria	6	4	3	3	5	5	5	7	7	7	6	8
23	Typho-mal. fever	4	3	1	2	0.9	2	4	4	4	5	6	7
24	Puerperal fever	3	2	2	2	2	2	2	2	3	4	3	4
25	Cerebro-spinal men	2	1	3	2	1	1	0.8	1	2	2	3	3
26	Inflam. of brain	3	1	2	2	2	3	3	3	3	3	4	5
27	Smallpox	0.6	1	0.4	.04	.05	4	0.3	0.6	0.3	.02	0	0.1
28	Membran. croup	2	0.4	0.6	0.5	0.7	1	2	2	2	3	4	4
No. of reports received		†4,903	5,513	5,126	5,219	4,418	3,940	4,395	5,572	5,853	5,281	4,291	4,939

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* The numbers opposite the names of the diseases do not state what per cent of the whole number of reports for the year stated the disease to be present at some time during the year, but state (on an average for twelve months of the year) what per cent of reports for the several months stated the disease to be present in those months. The column for each year is thus a statement for an average month of that year. On the two following pages of this table, however, the columns for each month state what per cent of the reports for that month (the number of which is stated at the foot of the column) stated the given disease to be present in that month.

† Average per year.

TABLE 1.— CONTINUED.—*Stating for each of 28 diseases by months, on what per cent and 1900; also the average by months*

	What per cent of the reports received stated presence of the disease.											
	January.				February.				March.			
Line number.	Diseases.	Av. '90–99.	1900.†	1899.	Diseases.	Av. '90–99.	1900.†	1899.	Diseases.	Av. '90–99.	1900.†	1899.
	Average disease*...	21	18	18	Average disease*.	20	19	19	Average disease*.	21	19	18
1	Rheumatism........	67	68	63	Rheumatism......	67	66	59	Rheumatism......	69	71	68
2	Influenza...........	76	60	88	Bronchitis	66	64	62	Influenza..........	74	65	77
3	Neuralgia	64	57	58	Influenza..........	78	64	91	Bronchitis	65	65	59
4	Bronchitis	66	57	63	Neuralgia..........	65	60	58	Neuralgia	67	62	57
5	Tonsillitis...........	56	54	53	Tonsillitis..........	55	54	49	Tonsillitis..........	54	55	49
6	Consumption, pul..	34	27	20	Pneumonia........	42	33	46	Pneumonia	37	33	35
7	Pneumonia..........	41	26	37	Consumption, pul.	33	26	19	Measles............	12	31	7
8	Inflam. of kidney...	19	23	20	Pleuritis	24	24	24	Pleuritis	25	23	24
9	Pleuritis	24	21	19	Inflam. of kidney.	20	22	16	Inflam. of kidney.	20	22	22
10	Diarrhea	24	20	19	Measles............	9	19	3	Consumption, pul.	34	22	19
11	Scarlet fever.........	11	16	12	Diarrhea	24	15	17	Diarrhea	26	19	22
12	Measles	6	15	2	Scarlet fever......	10	13	14	Intermittent fev..	19	12	11
13	Erysipelas...........	16	13	12	Intermittent fev..	18	13	12	Erysipelas.........	17	11	12
14	Intermittent fever..	19	12	13	Erysipelas.........	17	11	13	Scarlet fever......	10	9	11
15	Remittent fever....	15	9	7	Inflam. of bowels..	9	8	8	Inflam. of bowels.	10	8	8
16	Inflam. of bowels...	9	9	9	Remittent fever..	14	7	10	Typhoid fev. (ent.)	4	5	3
17	Whooping-cough....	7	7	4	Whooping-cough..	7	5	2	Whooping-cough .	7	5	2
18	Typhoid fever (ent.)	6	6	3	Typhoid fev. (ent.)	5	5	2	Cholera morbus...	3	3	1
19	Dysentery...........	5	4	3	Dysentery	5	3	2	Puerperal fever...	3	3	3
20	Diphtheria..........	7	3	3	Cerebro-spi. men.	2	2	2	Diphtheria.........	5	2	4
21	Cholera morbus.....	3	3	1	Diphtheria	6	2	4	Cerebro-spi. men..	3	2	6
22	Cholera infantum...	1	2	1	Cholera infantum.	1	1	1	Dysentery.........	5	2	3
23	Puerperal fever.....	3	2	0.8	Puerperal fever...	3	1	2	Remittent fever..	14	1	8
24	Inflam. of brain.....	2	1	3	Cholera morbus...	3	1	0.5	Typho-mal. fever..	2	1	0
25	Cerebro-spi. men....	1	1	1	Inflam. of brain...	4	0.7	3	Cholera infantum	8	0.8	0.4
26	Typho-mal. fever....	2	0.8	0.8	Membran. croup..	3	0.2	2	Inflam. of brain...	3	0.5	1
27	Membran. croup....	3	0.2	0.5	Typho-mal. fever..	2	0.2	0.5	Smallpox..........	0.8	0.3	2
28	Smallpox	0.2	0	0	Smallpox..........	0.6	0	0	Membran. croup..	3	0	0.6
	Reports received‡..	400	481	397	Reports received‡	371	409	374	Reports received‡	407	375	504

	April.				May.				June.			
Line number.	Diseases.	Av. '90–99.	1900.†	1899.	Diseases.	Av. '90–99.	1900.†	1899.	Diseases.	Av. '90–99.	1900.†	1899.
	Average disease*...	21	19	18	Average disease*..	19	18	16	Average disease*.	18	16	15
1	Rheumatism.........	70	66	67	Rheumatism......	67	68	63	Rheumatism......	63	67	63
2	Influenza............	63	63	57	Neuralgia	60	61	57	Neuralgia..........	55	53	53
3	Bronchitis	64	63	60	Bronchitis	54	53	53	Tonsillitis.........	36	41	33
4	Neuralgia	65	62	60	Tonsillitis.........	45	47	41	Bronchitis	44	41	37
5	Tonsillitis...........	52	52	50	Influenza	43	44	33	Diarrhea	36	36	37
6	Measles..............	15	28	11	Diarrhea	27	25	23	Influenza..........	27	29	20
7	Pneumonia	32	25	26	Measles............	17	25	14	Consumption, pul.	33	26	24
8	Diarrhea.............	26	24	27	Inflam. of kidney.	21	24	21	Measles	14	23	10
9	Inflam. of kidney...	23	23	24	Consumption, pul.	35	23	20	Inflam. of kidney.	19	21	19
10	Pleuritis	22	22	19	Pleuritis	18	20	16	Intermittent fev..	26	15	19
11	Consumption, pul...	37	20	21	Pneumonia........	22	19	15	Pleuritis	13	15	11
12	Intermittent fever..	24	13	19	Intermittent fev..	25	15	19	Inflam. of bowels..	12	11	10
13	Scarlet fever.........	11	12	11	Inflam. of bowels.	10	12	7	Cholera morbus...	13	11	10
14	Inflam. of bowels...	11	11	11	Erysipelas	16	11	9	Scarlet fever......	8	11	5
15	Remittent fever....	15	10	11	Scarlet fever......	10	11	7	Erysipelas.........	15	10	9
16	Erysiplas............	17	10	9	Remittent fever..	17	8	11	Remittent fever..	18	9	11
17	Typhoid fever (ent.)	3	6	3	Dysentery.........	5	5	4	Cholera infantum.	8	9	6
18	Dysentery...........	5	3	3	Whooping-cough..	8	4	2	Dysentery	9	9	8
19	Cholera morbus.....	4	3	3	Cholera morbus...	5	4	4	Pneumonia........	11	7	6
20	Cholera infantum...	1	3	2	Diphtheria........	5	3	3	Whooping-cough..	8	5	3
21	Whooping-cough....	8	3	1	Typhoid fev. (ent.)	3	2	4	Typhoid fev. (ent.)	5	4	7
22	Cerebro-spi. men...	2	2	7	Smallpox..........	0.1	2	0	Diphtheria........	5	4	2
23	Puerperal fever.....	4	1	2	Cerebro-spi. men..	3	2	6	Smallpox..........	0.2	2	0.2
24	Diphtheria..........	5	1	2	Cholera infantum.	3	2	0.7	Puerperal fever ..	3	2	2
25	Inflam. of brain.....	4	1	5	Inflam. of brain...	3	2	1	Cerebro-spi. men..	2	1	4
26	Smallpox............	0.5	0.9	2	Typho-mal. fever..	2	0.8	0	Inflam. of brain...	3	0.5	1
27	Membran. croup....	2	0	0.3	Membran. croup..	2	0.4	0.6	Typho-mal. fever..	2	0.2	1
28	Typho-mal. fever....	2	0	0	Puerperal fever...	3	0.4	3	Membran. croup..	1	0	0
	Reports received‡..	341	352	380	Reports received‡	405	475	541	Reports received‡	412	433	452

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* This note is on the preceding page. ‡ The numbers in this line

† Statements in this exhibit for months in 1900, are graphically represented in Diagrams 1 to

of the reports received the diseases were stated to be present in each of the years 1899 for the period of 10 years, 1890-99.

What per cent of the reports received stated presence of the disease.

July.				August.				September.				
Diseases.	Av. '90-99.	1900 †	1899.	Diseases.	Av. '90-99.	1900.†	1899.	Diseases.	Av. '90-99.	1900.†	1899.	Line number.
Average disease*...	19	17	17	Average disease*..	27	19	17	Average disease*..	21	21	19	
Rheumatism........	60	59	64	Diarrhea	72	72	68	Diarrhea	71	75	72	1
Diarrhea	56	52	53	Rheumatism......	57	57	57	Rheumatism......	59	61	63	2
Neuralgia	52	49	50	Neuralgia..........	51	47	47	Neuralgia..........	52	49	54	3
Tonsillitis...........	33	38	30	Cholera morbus...	39	39	32	Cholera infantum.	30	43	24	4
Bronchitis	37	36	38	Cholera infantum.	34	36	31	Dysentery	37	42	43	5
Consumption, pul...	33	28	25	Dysentery	35	36	39	Cholera morbus...	33	39	28	6
Cholera morbus.....	29	22	25	Tonsillitis.........	32	35	27	Bronchitis.........	43	37	43	7
Inflam. of kidney ...	18	22	19	Bronchitis..........	38	32	32	Tonsillitis..	34	36	34	8
Influenza	19	19	14	Consumption, pul.	32	27	19	Typhoid fev. (ent.)	18	27	14	9
Dysentery	19	18	23	Intermittent fev..	31	18	21	Consumption, pul.	32	26	21	10
Cholera infantum...	20	17	17	Inflam. of kidney.	16	18	16	Influenza..........	25	26	17	11
Measles	8	14	9	Influenza..........	19	17	15	Intermittent fev..	30	23	18	12
Intermittent fever..	29	12	23	Typhoid fev. (ent.)	14	16	12	Inflam. of kidney..	16	17	18	13
Inflam. of bowels....	14	12	13	Inflam. of bowels..	17	15	16	Inflam. of bowels..	15	14	14	14
Erysipelas............	13	11	8	Remittent fever..	23	11	14	Remittent fever..	25	14	17	15
Typhoid fever (ent.)	7	11	7	Pleuritis	8	10	7	Pleuritis	11	12	9	16
Pleuritis	11	10	11	Scarlet fever......	6	10	4	Erysipelas.........	11	10	5	17
Remittent fever....	21	9	13	Erysipelas.........	11	8	9	Scarlet fever......	7	10	6	18
Scarlet fever........	7	9	5	Whooping-cough..	10	8	4	Pneumonia.........	8	5	6	19
Whooping-cough ...	10	8	4	Measles............	4	6	4	Whooping-cough .	8	5	5	20
Pneumonia..........	8	5	3	Typho mal. fever..	6	6	2	Typho-mal. fever..	7	4	2	21
Typho-mal. fever...	3	4	3	Pneumonia.........	6	4	2	Diphtheria.........	5	4	3	22
Diphtheria...........	4	2	0	Diphtheria...	4	2	0.6	Measles............	2	4	3	23
Inflam. of brain.....	3	1	1	Cerebro-spi. men..	2	2	0.2	Puerperal fever...	2	2	1	24
Puerperal fever.....	2	1	2	Puerperal fever...	2	1	1	Inflam. of brain...	2	2	0.5	25
Smallpox............	0.1	1	0	Inflam. of brain...	3	1	0.8	Cerebro-spi. men..	2	1	2	26
Cerebro-spi. men....	2	0.6	3	Smallpox	0.05	0.5	0	Membran. croup..	0.8	0.6	0.5	27
Membran. croup....	0.9	0.2	0.2	Membran. croup..	0.5	0.2	0	Smallpox..........	0.03	0	0	28
Reports received‡..	429	485	404	Reports received‡	452	608	488	Reports received†	427	501	385	

October.				November.				December.				
Diseases.	Av. '90-99.	1900.†	1899.	Diseases.	Av. '90-99.	1900.†	1899.	Diseases.	Av. '90-99.	1900.†	1899.	
Average disease*....	20	19	17	Average disease*..	19	18	17	Average disease*.	20	18	17	
Rheumatism.........	63	59	65	Rheumatism......	65	60	60	Rheumatism......	66	63	68	1
Diarrhea	51	57	47	Neuralgia..........	60	58	58	Neuralgia..........	60	59	61	2
Neuralgia............	57	55	56	Bronchitis	57	51	52	Bronchitis	62	57	59	3
Bronchitis............	50	43	48	Tonsillitis..........	50	48	49	Influenza..........	61	52	47	4
Tonsillitis............	43	41	40	Influenza..........	45	36	35	Tonsillitis..........	55	50	56	5
Typhoid fever (ent).	21	33	21	Diarrhea	29	34	31	Typhoid fev. (ent.)	10	27	10	6
Influenza.............	31	29	24	Typhoid fev. (ent.)	16	32	18	Consumption, pul.	31	24	26	7
Consumption, pul...	39	27	22	Consumption, pul.	31	24	26	Diarrhea	24	24	26	8
Intermittent fever..	28	24	21	Inflam. of kidney..	20	21	23	Pneumonia.........	27	22	15	9
Dysentery............	22	22	18	Intermittent fev..	24	19	17	Pleuritis	20	20	19	10
Cholera morbus.....	14	20	11	Scarlet fever......	11	17	8	Inflam. of kidney..	18	16	18	11
Remittent fever....	24	18	16	Pneumonia.........	19	16	12	Remittent fever..	17	15	10	12
Inflam. of kidney...	17	17	17	Remittent fever..	20	15	12	Scarlet fever......	11	15	6	13
Scarlet fever........	9	13	6	Pleuritis	17	12	18	Intermittent fev..	19	13	11	14
Cholera infantum...	12	13	8	Erysipelas.........	14	9	11	Inflam. of bowels..	10	10	8	15
Pleuritis	13	11	10	Diphtheria.........	8	9	3	Erysipelas.........	16	9	12	16
Inflam. of bowels...	12	11	9	Dysentery.........	8	6	6	Diphtheria.........	8	6	4	17
Erysipelas............	12	9	6	Inflam. of bowels..	9	6	8	Smallpox...	0	5	0	18
Pneumonia..........	12	7	7	Typho-mal. fever..	5	5	1	Measles	4	4	6	19
Diphtheria..........	7	6	5	Cholera morbus...	5	5	4	Cholera morbus...	3	3	2	20
Measles	2	4	2	Measles.	3	3	3	Dysentery	5	3	4	21
Typho-mal. fever....	8	4	3	Cholera infantum.	2	2	3	Typho-mal. fever..	3	2	1	22
Inflam. of brain.....	2	2	0.3	Smallpox..........	0.1	2	0.2	Puerperal fever...	2	2	0.3	23
Whooping-cough....	6	1	5	Inflam. of brain...	2	2	0.4	Membran. croup..	3	2	1	24
Cerebro-spi. men...	1	1	2	Whooping-cough..	7	2	5	Cerebro-spi. men..	1	1	1	25
Smallpox............	0.2	0.9	0.5	Membran. croup..	3	1	2	Cholera infantum.	1	0.7	0.6	26
Membran. croup....	2	0.6	0.3	Puerperal fever...	2	1	2	Whooping-cough .	7	0.7	8	27
Puerperal fever.....	2	0.6	3	Cerebro-spi. men..	1	0.2	1	Inflam. of brain...	3	0.2	1	28
Reports received‡..	423	540	370	Reports received‡	430	432	468	Reports received‡	407	422	363	

state how many reports were received for the month in the given years.
5, in this article.

TABLE 2.—*By months and by geographical divisions of the State,* the names of 210 observers, whose weekly reports of diseases for 1900 are compiled in Tables 1 to 17 in this article, the localities*a *for which they report, and the number of reports received from each observer.*

Divisions and localities represented and physicians who reported. (Voluntary observers in italics.)	Weekly reports in 1900.—Compiled in this article.												
	Year, 1900.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
All localities	**5,513**	**481**	**409**	**375**	**352**	**475**	**433**	**485**	**608**	**501**	**540**	**432**	**422**
Upper Peninsula Division	**371**	**22**	**18**	**14**	**16**	**28**	**26**	**37**	**55**	**39**	**46**	**36**	**34**
Bessemer, E. H. Madajesky, M. D	24	....	....	....	....	....	....	2	5	4	5	4	4
Crystal Falls, C. F. Larsen, M. D	28	....	....	....	....	....	3	4	5	4	5	4	3
Detour, W. B. House, M. D	5	....	....	....	....	....	....	2	3	....	....	....	..
Escanaba, C. H. Long, M. D	30	...	....	....	....	....	4	4	5	4	5	4	4
Ironwood, J. C. Yates, M. D	19	....	....	....	....	5	4	4	3	....	3	....	....
Ishpeming, W. S. Picotte, M. D	22	....	....	....	....	....	....	....	5	4	5	4	4
Marquette, F. McD. Harkin, M. D	17	5	4	4	4	....	....	....	....	....	....	....	....
Marquette, A. E. Brown, M. D	35	....	....	....	....	5	4	4	5	4	5	4	4
Newberry, A. W. Nicholson, M. D	15	....	....	....	....	4	....	3	5	3	....	....	....
Ontonagon, J. S. Nitterauer, M. D	45	3	3	3	4	4	3	4	5	4	4	4	4
Rockland Tp., *W. C. Gates, M. D*	28	4	3	....	....	...	....	2	4	4	4	4	3
Sault Ste. Marie, J. J. Griffin, M. D	51	5	4	3	4	5	4	4	5	4	5	4	4
Wakefield, J. H. Eddy, M. D	52	5	4	4	4	5	4	4	5	4	5	4	4
Northwestern Division	**283**	**20**	**14**	**14**	**19**	**14**	**28**	**30**	**42**	**29**	**27**	**23**	**23**
Bear Lake, C. A. Norconk, M. D	26	5	2	3	3	....	2	....	5	3	3	....	...
Cadillac, D. Ralston, M. D	7	....	....	....	....	..	2	2	3	....	....	....	....
Fife Lake, L. S. Walter, M. D	48	5	4	4	4	5	2	4	5	4	4	3	4
Kingsley, G. L. Fenton, M. D	48	5	4	3	4	4	3	3	5	4	5	4	4
Manistee, A. A. McLarty, M. D	29	....	...	....	....	....	4	3	5	4	5	4	4
Manton, T. A. Corlett, M. D	49	5	4	4	4	5	4	4	5	4	5	3	2
Sherman, D. L. Rose, M. D	8	....	....	....	4	....	....	2	....	2	....	....	....
Sutton's Bay, E. C. Van de Walker, M. D.	15	....	....	....	....	....	3	4	4	...	....	2	2
Thompsonville, R. McDermott, M. D	23	....	....	....	....	....	4	4	5	4	....	3	3
Traverse City, J. M. Wilhelm, M. D	30	....	....	....	....	....	4	4	5	4	5	4	4
Northern Division	**291**	**23**	**15**	**21**	**27**	**29**	**25**	**22**	**31**	**23**	**28**	**19**	**28**
Boyne City, A. J. H. DeLacy, M. D	45	5	3	4	4	5	3	3	5	4	5	....	4
Boyne Falls, G. L. Laraway, M. D	32	....	....	....	4	5	4	3	3	....	5	4	4
Charlevoix, A. A. Swinton, M. D	35	3	....	2	3	....	4	2	5	4	5	3	4
East Jordan, F. A. Foster, M. D	52	5	4	4	4	5	4	4	5	4	5	4	4
Kalkaska, P. W. Pearsall, M. D	47	5	4	4	4	5	2	2	4	4	5	4	4
Mancelona, C. Beaver, M. D	42	5	4	4	4	5	4	4	5	3	...	....	4
Petoskey, A. G. Oven, M. D	9	....	....	3	4	2	....	....	....	....	....	....	....
Petoskey, G. E. Reycraft, M. D	29	....	....	....	....	2	4	4	4	4	3	4	4
Northeastern Division	**178**	**20**	**15**	**12**	**12**	**18**	**16**	**14**	**15**	**16**	**15**	**13**	**12**
East Tawas, H. A. Goodale, M. D	8	5	3	....	....	....	....	....	....	....	....	....	....
Harrisville, *D. W. Mitchell, M. D.*	52	5	4	4	4	5	4	4	5	4	5	4	4
Onaway, H. M. Farnham, M. D	15	....	....	....	....	3	4	2	....	4	....	2	....
Rogers City, C. W. Isaminger, M. D	51	5	4	4	4	5	4	4	5	4	5	3	4
West Branch, W. H. Witter, M. D	52	5	4	4	4	5	4	4	5	4	5	4	4
Western Division	**506**	**56**	**49**	**39**	**40**	**45**	**32**	**37**	**42**	**32**	**49**	**42**	**43**
Casnovia, F. D. Hersey, M. D	19	....	3	3	2	...	3	3	....	....	....	2	3
Cedar Springs, J. B. Dewar, M. D	8	4	4	....	....	....	....	....	....	....	....	....	....
Custer, A. D. Kibbie, M. D	47	5	4	4	3	4	2	4	4	4	5	4	4
Grand Haven, W. S. Walkley, M. D	50	4	4	4	4	5	4	3	5	4	5	4	4
Grand Rapids, *A. Hazlewood, M. D.*	48	5	4	4	4	5	4	3	4	2	5	4	4
Holland, H. Kremers, M. D	16	5	4	4	3	....	....	....	....	....	....	....	....
Holland, B. B. Godfrey, M. D	14	....	....	...	....	3	....	4	4	....	3	....	....
Lisbon, R. L. Cornwell, M. D	46	5	2	....	4	5	4	4	5	4	5	4	4
Lowell, O. C. McDannell, M. D	51	4	4	4	4	5	4	4	5	4	5	4	4
Ludington, E. T. Fromen, M. D.	20	5	4	4	4	3	....	....	....	....	....	....	....
Ludington, F. W. Graham, M. D	11	....	....	....	....	....	....	....	....	....	3	4	4
Rockford, H. O. Sarber, M. D.	52	5	4	4	4	5	4	4	5	4	5	4	4
Sand Lake, C. J. Annes, M. D	9	5	4	....	....	....	....	....	....	....	....	....	....
Sand Lake, A. R. Hicks, M. D	13	....	....	....	....	....	....	....	....	2	3	4	4
Sparta, B. J. Zudzense, M. D	50	4	4	4	4	5	3	4	5	4	5	4	4
White Cloud, W. C. Derby, M. D	52	5	4	4	4	5	4	4	5	4	5	4	4

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* The counties in each division are shown on maps of the State, on pages 201 and 217 of the report of this Board for 1886.

a In many cases the reports include sickness in the vicinity as well as the corporate limits of the places named.

TABLE 2.—CONTINUED.

Divisions and localities represented and physicians who reported. (Voluntary observers in italics.)	Weekly reports in 1900.—Compiled in this article.												
	Year, 1900.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Northern Central Division	**221**	**27**	**24**	**22**	**12**	**14**	**21**	**19**	**17**	**20**	**19**	**14**	**12**
Beaverton, F. S. Pierce, M. D	41	4	4	4	3	3	4	2	2	4	5	3	3
Big Rapids, W. A. Whitney, M. D	5	....	....	....	....	....	....	....	3	2	....	....	....
Evart, J. M. Wilkinson, M. D	20	....	....	....	3	3	2	3	3	2	4	....	....
Farwell, E. B. Evans, M. D	9	5	4	....	....	....	....	....	....	....	....	....	....
Farwell, L. L. Kelley, M. D	19	....	....	....	....	3	4	3	4	3	....	2	....
Gladwin, J. W. Leininger, M. D	7	5	2	....	....	....	....	....	....	....	....	....	....
Gladwin, C. G. Suylandt, M. D	13	....	....	....	....	....	4	3	....	2	....	2	2
Lake City, J. W. Decker, M. D	6	..	....	3	....	....	3	....	....	....	....	....	....
Mecosta, J. Snyder, M. D	28	4	4	3	3	....	....	....	....	3	5	3	3
Midland, C. E. McCallum, M. D	10	....	3	4	3	....	....	....	....	....	....	....	....
Mt. Pleasant, P. E. Richmond, M. D	11	4	3	4	....	....	....	....	....	....	....	....	....
Roscommon, J. H. Curnalia, M. D	39	5	4	4	....	....	....	4	5	4	5	4	4
Shepherd, D. M. King, M. D	13	....	....	....	....	5	4	4	....	....	....	....	....
Bay and Eastern Division	**711**	**60**	**51**	**46**	**38**	**65**	**58**	**61**	**70**	**68**	**80**	**58**	**56**
Algonac, W. E. Bostwick, M. D	12	....	....	....	....	....	....	....	....	3	3	3	3
Almont, D. H. Burley, M. D	52	5	4	4	4	5	4	4	5	4	5	4	4
Brown City, J. W. Weed, M. D	32	3	4	3	2	4	2	4	4	3	....	3	....
Cass City, M. M. Wickware, M. D	10	4	3	3	....	....	....	....	....	....	....	....	....
Cass City, D. P. Deming, M. D	35	....	....	....	....	5	4	4	5	4	5	4	4
Chesaning, D. W. Mudge, M. D	17	....	....	....	4	5	4	4	....	....	....	....	....
Clifford, J. R. McLeod, M. D	12	....	....	....	....	....	2	3	...	3	4	....	....
Columbiaville, E. Conley, M. D	15	5	4	3	3	....	....	....	....	....	....	....	....
Croswell, T. S. Kingston, M. D	50	5	4	4	2	5	4	4	5	4	5	4	4
Deckerville, G. C. Vincent, M. D	51	5	4	4	4	4	4	4	5	4	5	4	4
Dryden, H. E. Randall, M. D	7	4	3	....	....	....	....	....	....	....	....	....	....
Dryden, J. E. Parker, M. D	29	....	....	....	....	....	3	4	5	4	5	4	4
Elkland Tp., *J. M. Truscott, M. D.*	12	....	....	....	....	5	4	3	....	....	....	....	...
Emmet, W. C. Martin, M. D	10	....	2	4	4	....	....	....	....	....	....	....	....
Emmet, J. L. Chester, M. D	16	....	....	....	....	....	....	....	....	4	4	4	4
Fremont Tp. (Tuscola Co.), B. D'Arcy, M. D	15	4	4	4	3	....	....	....	....	....	....	....	....
Lapeer, J. H. Taylor, M. D	22	....	....	....	....	4	....	....	3	3	4	4	4
Lexington, L. T. Schurrer, M. D	51	5	4	4	4	5	4	4	5	4	5	4	3
Marine City, F. Blagborne, M. D	25	....	....	....	...	3	4	4	5	4	5	....	....
Oakley, T. H. O'Rourke, M. D	8	5	3	....	....	....	....	....	....	....	....	....	....
Pinconning, W. B. Abbott, M. D	9	....	....	....	....	3	....	2	....	2	....	....	2
Reese, J. MacKenzie, M. D	52	5	4	4	4	5	4	4	5	4	5	4	4
Sebewaing, H. R. Morris, M. D	13	....	....	....	....	3	4	3	3	....	....	....	....
St. Charles, A. Paterson, M. D	26	....	....	....	....	4	4	4	5	4	5	....	....
Thornville, *J. S. Caulkins. M: D*	52	5	4	4	4	5	4	4	5	4	5	4	4
Vassar, F. D. LeValley, M. D	22	....	....	....	....	....	....	....	5	4	5	4	4
West Bay City, A. F. Hagadorn, M. D	26	....	....	2	...	....	....	2	5	4	5	4	4
Yale, B. Clyne, M. D	12	5	4	3	....	....	....	....	....	....	....	....	....
Yale, W. G. Wight, M. D	18	....	....	....	....	....	3	....	....	2	5	4	4
Central Division	**1,146**	**97**	**83**	**72**	**69**	**106**	**90**	**110**	**134**	**107**	**106**	**90**	**82**
Ashley, M. G. Bassett, M. D	14	....	....	....	....	5	3	3	3	....	....	....	....
Belding, I. Ohlinger, M. D	35	5	4	4	4	....	2	4	5	2	....	3	2
Bellevue, A. W. Adams, M. D	10	....	....	....	....	....	....	3	5	2	....	....	....
Brighton, H. M. Ptolmey, M. D	38	5	3	3	3	4	3	2	5	3	....	3	4
Charlotte, V. J. Rickerd, M. D	14	5	4	3	2	....	....	....	....	....	....	....	....
Durand, A. G. Cowles, M. D	33	....	....	....	....	4	3	4	5	4	5	4	4
Eagle, H. N. Swaney, M. D	7	....	....	....	....	....	....	....	....	4	3	....	....
Eaton Rapids, A. E. West, M. D	34	....	....	....	....	4	4	4	5	4	5	4	4
Elsie, J. H. Travis, M. D	17	3	3	....	....	....	....	3	3	....	....	2	3
Evergreen Tp. (Montcalm Co.), *W. H. Budd, M. D.*	16	5	4	4	3	....	....	....	....	....	....	....	....
Fenton, A. G. Wright, M. D	34	....	....	....	....	4	4	4	5	4	5	4	4
Flint, M. S. Knapp, M. D	9	5	4	....	....	....	...	....	....	....	....	....	....
Flint, J. H. Charters, M. D	36	....	....	....	3	4	4	4	5	4	4	4	4
Flushing, C. S. Wheeler, M. D	52	5	4	4	4	5	4	4	5	4	5	4	4
Fowler, E. Schemer, M. D	17	....	....	....	....	....	....	4	5	4	4	....	....
Gaines, G. H. Alway, M. D	27	....	....	....	....	3	3	4	4	2	4	4	3
Grand Ledge, F. W. Judson, M. D	22	5	4	4	4	5	....	....	....	....	....	....	....
Greenville, C. O. Jenison, M. D	30	....	....	....	....	....	4	4	5	4	5	4	4
Hamburg Tp., *J. N. Swartz, M. D.*	51	5	4	4	4	5	4	4	5	4	5	4	3
Howard City, J. Totten, M. D	52	5	4	4	4	5	4	4	5	4	5	4	4
Ionia, H. Tremayne, M. D	40	5	4	4	4	5	3	3	....	2	5	3	2
Ithaca, W. Monfort, M. D	16	....	....	....	....	....	4	3	...	4	5	....	....
Laingsburg, R. H. Scott, M. D	32	....	4	4	4	5	4	4	4	3	....	....	....
Lakeview, F. R. Blanchard, M. D	6	....	....	....	....	....	2	....	....	4	....	....	....
Lansing, *P. A. Tyler, M. D.*	30	4	4	4	3	3	4	2	3	3	....	....	....
Lansing, V. W. Connor, M. D	32	....	....	....	....	3	3	4	5	4	5	4	4

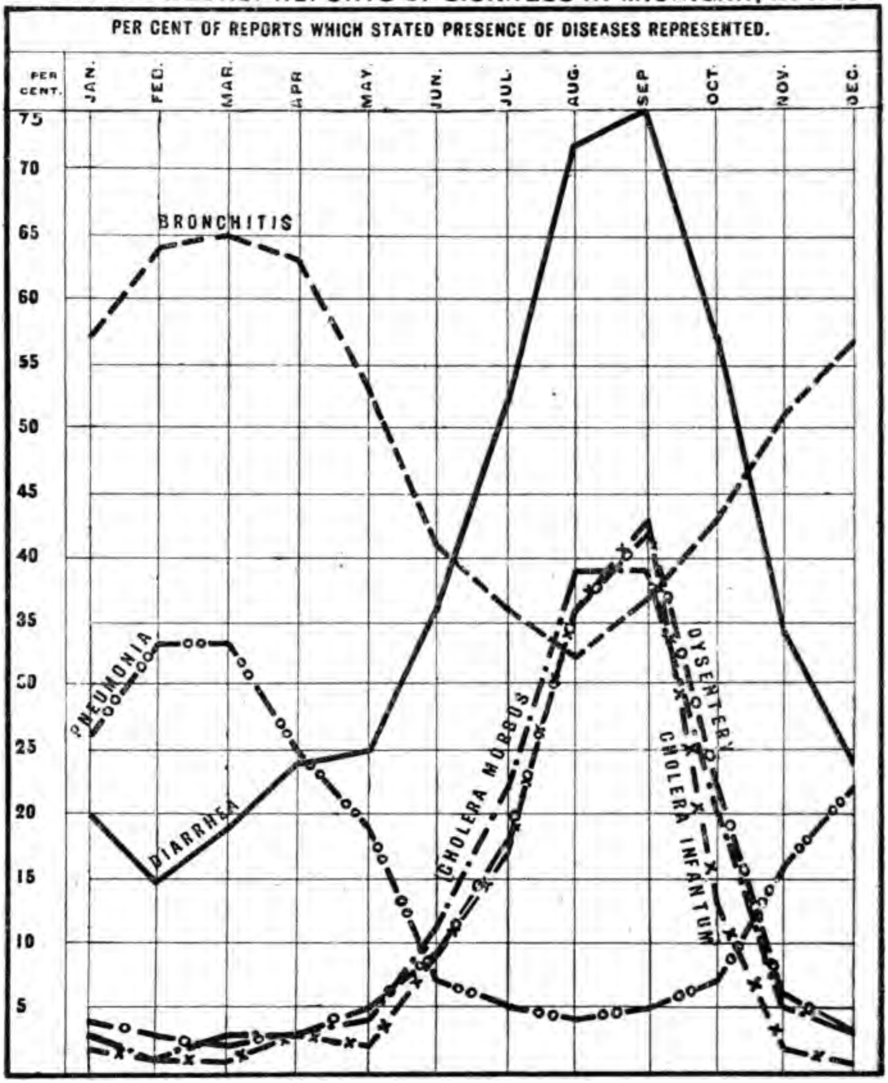
TABLE 2.—CONTINUED.

Divisions and localities represented and physicians who reported. (Voluntary observers in italics.)	Weekly reports in 1900.—Compiled in this article.												
	Year, 1900.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Central Division—Continued.													
Linden, M. E. Topping, M. D.	29	5	3	....	....	....	...	....	5	3	5	4	4
Lyons, D. C. Spalding, M. D.	13	5	4	4	....	....	....	....	....	....	....	....	....
Maple Rapids, R. H. Sanborn, M. D.	14	...	....	....	....	5	....	....	....	4	3	2	....
McBride, D. C. Bell, M. D.	22	5	4	4	4	5	....	....	....	....	....	....	....
Nashville, E. T. Morris, M. D.	50	5	4	4	4	3	4	4	5	4	5	4	4
Ovid, J. E. Taylor, M. D.	52	5	4	4	4	5	4	4	5	4	5	4	4
Owosso, P. S. Wilson, M. D.	29	....	....	....	....	4	4	4	4	4	5	2	2
Perrinton, E. C. Van Decor, M. D.	25	5	4	4	4	5	3	....	....	....	....	....	...
Perrinton, T. H. Crawford, M. D.	8	....	....	....	....	....	....	....	4	2	....	2	....
Perry, L. M Cudworth, M. D.	6	....	....	....	....	....	....	4	...	....	....	2	....
Potterville. E. R. Espie, M. D.	51	5	4	4	4	5	4	4	5	3	5	4	4
Sheridan, H. B. Johnson, M. D.	7	....	....	....	....	....	....	3	4	...	....	....	....
St. Johns, J. W. Pollard, M. D.	11	5	4	2	....	....	....	...	....	....	....	....	....
St. Johns, H. D. Squair, M. D.	40	....	....	2	4	5	3	4	5	4	5	4	4
Sunfield, F. H. Snell, M. D.	26	....	....	....	....	....	....	4	5	4	5	4	4
Vermontville, C. S. Snell, M. D.	27	....	2	2	....	....	4	4	5	2	....	4	4
Vernon, W. H. Holtzman, M. D.	32	....	....	....	3	5	2	4	5	4	3	3	3
Southwestern Division	**395**	**29**	**27**	**30**	**28**	**37**	**33**	**32**	**41**	**40**	**38**	**30**	**30**
Allegan, D. Calkins, M. D.	42	5	2	4	4	5	3	....	3	4	4	4	4
Benton Harbor, W. Ryno, M. D.	12	....	....	....	....	5	3	4	....	....	....	....	....
Buchanan, J. A. Garland, M. D.	41	5	4	4	2	....	2	3	5	4	4	4	4
Douglas, H. A. Stroud, M. D.	37	5	4	4	4	5	4	3	4	2	....	....	2
Dowagiac, C. M. Myers, M. D.	12	....	....	....	....	3	3	....	3	3	....	....	....
Fennville, W. H. Andrews, M. D.	23	....	....	....	....	4	4	4	....	4	5	2	....
Galien, S. A. Clark, M. D.	24	....	....	....	....	....	....	2	5	4	5	4	4
New Buffalo, D. R. Harris, M. D.	23	5	4	3	4	3	2	2	....	....	....	....	....
Niles, J. D. Greenamyer, M. D.	48	4	3	3	4	5	4	4	5	3	5	4	4
Otsego, J. W. Toan, M. D.	12	....	4	4	2	....	....	....	....	2	....	....	....
Paw Paw, C. S. Maynard, M. D.	24	....	2	4	4	4	3	2	3	2	....	....	....
Saugatuck, H. H. Stimson, M. D.	17	5	4	4	4	....	....	....	....	....	....	....	....
Saugatuck, J. H. Pear, M. D.	32	....	....	....	....	3	3	4	5	4	5	4	4
South Haven, M. E. Bishop, M. D.	20	....	....	....	....	....	....	....	3	4	5	4	4
St. Joseph, F. M. Gowdy, M. D.	6	...	...	....	....	....	2	4	....	....	....	....	....
Watervliet, W. L. Garratt, M. D.	22	....	....	....	...	....	....	....	5	4	5	4	4
Southern Central Division	**906**	**78**	**67**	**63**	**55**	**79**	**72**	**84**	**106**	**83**	**85**	**69**	**65**
Albion, A. G. Bruce, M. D.	13	5	4	4	....	....	....	....	....	....	....	....	....
Albion, W. C. Marsh, M. D.	34	....	....	....	...	4	4	4	5	4	5	4	4
Ann Arbor, E. A. Clark, M. D.	52	5	4	4	4	5	4	4	5	4	5	4	4
Augusta, C. E. Doyle, M. D.	18	5	4	2	...	....	....	....	....	3	....	....	4
Burr Oak, R. Crofford, M. D.	52	5	4	4	4	5	4	4	5	4	5	4	4
Camden, J. A. Bates, M. D.	7	....	....	....	....	4	....	....	3	....	....	....	....
Climax, O. F. Seeley, M. D.	15		..		2	....	....	3	5	2	3		....
Clinton, J. L. Tuttle, M. D.	12	5	4	3	..	....	....	....	....			....	....
Clinton, G. V. Randall, M. D.	7		..		..	....	2	....	....	3		2	....
Colon Tp , *M. L. Bacon, M. D.*	27		..		..	4	2	3	3	3	5	4	3
Concord, F. S. Tuthill, M. D.	7	3	4		..	....	....	....	....			....	....
Concord, W. N. Keeler, M. D.	37		..		2	5	4	4	5	4	5	4	4
Constantine, C. F. Gustin, M. D.	14	5	3	3	3	....	....	....	....			....	....
Constantine, D. E. Thomas, M. D.	48	5	4	4	3	3	4	4	4	4	5	4	4
Galesburg, W. L. McBeth, M. D.	44	. ..	4		4	5	4	4	4	4	5	4	2
Galesburg, W. A. Burdick, M. D.	13	5	4	4	.	....	....	....	....				....
Grass Lake, W. A. Wilkinson, M. D.	14	..	....	....	..	....	....	2	5	4	3		...
Hanover, A. L. Ambrose, M. D.	36	4	4		4	5	2	2	...	4	3	2	2
Hillsdale, F. C. Mason, M. D.	30	....	....		..	....	4	4	5	4	5	4	4
Homer, J. A. Thompson, M. D.	13	5	4	4	..			....	....				....
Homer, A. D. Bangham, M. D.	8	....	....		3			2	...				....
Jackson, J. T. Main, M. D.	24	....	....		..			3	5	4	4	4	3
Marshall, F. M. Foote, M. D.	42	3	3		3	5	3	4	4	4	3	4	3
Mendon, W. A. Royer, M. D.	27	....	....		..			4	5	4	5	2	4
Milan, A. G. Measie, M. D.	11	....	....		..			4	3				....
North Adams, F. Noyes, M. D.	6	....	...		..			3	3				....
Quincy, W. H. Baldwin, M. D.	21				..			2	3		4	2	3
Sturgis, J. C. Curts, M. D.	17	5	4		4			....	...				....
Sturgis, T. O. Potter, M. D.	14				..	4		3	3				....
Tecumseh, *J. F. Jenkins, M. D.*	47	4	3		3	5		4	5	4	4	4	3
Tecumseh, W. H. Maddox, M. D.	15				..	5		2	5			3	....
Union City, W. C. Henderson, M. D.	52	5	4		4	5		4	5		5	4	4
Vicksburg, C. A. Bozarth, M. D.	13				3	5		....	3			....	....
White Pigeon, W. C. Cameron, M. D.	44	4	2		3	5		3	4		5	4	3
Wright Tp. (Hillsdale Co.), *C. Bates, M. D*	37				2	5		4	5	4	5	4	4
Ypsilanti, C. R. Wilcoxson, M. D.	17	5	4		4			....	..			...	....
Ypsilanti, O. E. Pratt, M. D.	18				..			4	4			2	3

TABLE 2.—CONCLUDED.

Divisions and localities represented and physicians who reported. (Voluntary observers in italics.)	Weekly reports in 1900.—Compiled in this article.												
	Year, 1900.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Southeastern Division	**505**	**49**	**46**	**42**	**36**	**40**	**32**	**39**	**55**	**44**	**47**	**38**	**37**
Armada, C. H. Lincoln, M. D	23	....	....	....	....	....	....	2	4	4	5	4	4
Dearborn, R. S. Law, M. D	11	....	3	4	4	....	....	....	....	....	....	....	....
Delray, A. I. Burdino, M. D	21	....	....	....	....	4	2	4	5	4	....	....	2
Dundee, E. E. Richardson, M. D	35	....	4	4	2	....	....	3	5	4	5	4	4
Highland Park, *A. Stewart, M. D*	16	5	4	4	3	....	....	....	....	....	....	....	....
Highland Tp. (Oakland Co.), *S. L. Weisbrod, M. D*	17	....	....	....	3	4	....	3	4	3	....	....	....
Holly, D. D. Bartholomew, M. D	11	5	4	2	....	....	....	....	....	....	....	....	....
Memphis, E. D. Mills, M. D	34	5	4	4	4	4	2	....	....	2	5	2	2
Mt. Clemens, A. J. Warren, M. D	24	5	4	4	4	5	2	....	....	....	....	....	....
Orion, T. H. Cooper, M. D	9	....	....	....	....	....	4	....	....	3	....	....	2
Plymouth, F. B. Adams, M. D	52	5	4	4	4	5	4	4	5	4	5	4	4
Pontiac, *M. W. Gray, M. D*	52	5	4	4	4	5	4	4	5	4	5	4	4
Richmond, F. T. Fenton, M. D	13	5	4	4	....	....	....	....	....	....	....	....	....
Richmond, J. F. McCarty, M. D	34	....	....	....	....	4	4	4	5	4	5	4	4
River Rouge, H. Belanger, M. D	20	....	....	....	....	....	....	2	5	4	5	4	....
Romeo, W. Greenshields, M. D	40	4	3	4	4	4	3	3	4	....	3	4	4
Springwells Tp., T. Schmalzriedt, M. D	51	5	4	4	4	5	4	4	5	4	4	4	4
Warren, J. C. Flynn, M. D	24	....	....	....	....	....	....	3	5	4	5	4	3
Wayne, H. E Foster, M. D	9	....	....	....	....	....	3	3	3	....	....	....	....
Wyandotte, W. C. Lambert, M. D	9	5	4	....	....	....	....	....	....	....	....	....	....

DIAGRAM I WEEKLY REPORTS OF SICKNESS IN MICHIGAN, IN 1900.



[PLATE 1086]

TABLE 4*.—*Stating for each of 11 years, 1890-1900, the number and per cent of observers by whom the following diseases were reported present; also an average for the period of 10 years, 1890-99. The diseases are arranged in order of greatest number of observers who reported them present in 1900.*† *(Continued for each month of 1899 and 1900 on the two pages following.)*

Line number.	Diseases.	Observers by whom the several diseases were reported present—average per cents (per month) of those making reports.‡											
		Av. 1890-99.	1900.	1899.	1898.	1897.	1896.	1895.	1894.	1893.	1892.	1891.	1890.
	Av. for tabulated diseases reported present	30	28	26	26	27	21	30	30	31	33	37	37
1	Rheumatism	80	76	74	76	81	78	78	78	80	83	86	87
2	Neuralgia	76	72	69	70	74	74	74	74	76	80	83	85
3	Tonsillitis	68	65	63	60	64	70	66	64	71	71	74	75
4	Bronchitis	70	64	64	65	66	70	69	67	72	73	75	81
5	Diarrhea	60	59	55	55	53	55	60	58	61	63	67	68
6	Influenza	59	54	53	59	61	59	58	55	57	56	69	67
7	Inflam. of kidney	32	34	30	29	30	29	33	31	29	36	36	36
8	Consumption, pul	40	30	28	25	25	29	35	43	47	49	60	62
9	Pneumonia	38	30	31	33	36	34	36	36	37	43	40	50
10	Pleuritis	31	30	30	29	30	32	32	28	27	35	36	35
11	Dysentery	26	28	23	23	24	23	28	27	25	29	30	31
12	Intermittent fever	38	27	28	32	27	31	35	36	37	43	52	58
13	Cholera morbus	25	25	19	23	21	23	26	27	26	29	31	29
14	Inflam. of bowels	26	24	21	24	24	23	25	27	25	28	31	29
15	Measles	14	23	12	12	22	12	8	11	14	7	17	22
16	Typhoid fever (ent.)	15	22	14	14	11	16	21	18	15	15	16	14
17	Cholera infantum	18	22	14	16	14	15	22	20	18	21	23	21
18	Scarlet fever	16	21	14	9	8	14	19	24	19	22	17	18
19	Erysipelas	30	20	20	25	27	26	28	27	29	34	39	43
20	Remittent fever	30	20	21	22	20	27	32	31	28	34	43	40
21	Diphtheria	11	8	5	6	10	10	10	13	13	15	13	16
22	Whooping-cough	13	8	6	8	7	12	14	18	15	18	16	17
23	Typho mal. fever	8	5	3	5	2	6	8	8	9	10	12	14
24	Puerperal fever	7	4	5	5	7	6	7	6	9	11	8	9
25	Cerebro-spi. men	5	3	7	6	3	4	2	4	5	5	6	8
26	Inflam. of brain	8	3	5	5	6	7	8	9	8	9	11	12
27	Smallpox	0.4	2	0.7	0.1	.09	1	0.5	1	0.3	.08	0	0.2
28	Membran. croup	5	1	2	2	3	2	4	5	5	8	10	11
	No. of observers	§182	210	213	217	167	144	185	189	205	199	145	155
	Av. No. of observers per month.	103	118	111	114	95	82	94	116	113	109	91	102

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* Table 3 is manuscript, not printed for lack of space.

† For 1900 the names of the observers and the number of the reports received from each are stated in Table 2.

‡ Foot-note on page 77.

§ Average per year.

TABLE 4.*—CONTINUED.—*Per cent of observers by whom the several diseases were for the period of*

Line number.	Per cent of observers by whom the diseases were reported present.†											
	January.				February.				March.			
	Diseases.	Av. '90-99.	1900.	1899.	Diseases.	Av. '90-99.	1900.	1899.	Diseases.	Av. '90-99.	1900.	1899.
	Average	31	29	25	Average	30	26	26	Average	31	27	28
1	Rheumatism	83	83	72	Rheumatism	81	77	72	Rheumatism	84	81	81
2	Influenza	85	79	94	Neuralgia	81	76	71	Influenza	89	79	89
3	Neuralgia	79	75	68	Bronchitis	80	74	73	Neuralgia	82	78	68
4	Tonsillitis	78	74	69	Influenza	88	74	96	Bronchitis	80	74	75
5	Bronchitis	80	72	76	Tonsillitis	74	72	69	Tonsillitis	76	73	72
6	Pneumonia	63	52	59	Pneumonia	63	52	64	Pneumonia	60	55	63
7	Diarrhea	44	44	35	Pleuritis	39	39	35	Diarrhea	46	37	46
8	Inflam. of kidney	33	43	32	Inflam. of kidney	33	32	26	Measles	20	36	15
9	Pleuritis	42	42	37	Diarrhea	42	32	32	Pleuritis	42	36	41
10	Consumption, pul.	42	35	23	Consumption, pul.	39	32	21	Inflam. of kidney	35	33	38
11	Erysipelas	32	27	23	Measles	15	31	7	Consumption, pul.	41	25	25
12	Measles	12	26	5	Erysipelas	33	22	27	Inflam. of bowels.	24	22	18
13	Scarlet fever	21	25	21	Scarlet fever	17	21	22	Intermittent fever	31	22	24
14	Intermittent fever	30	23	21	Inflam. of bowels	20	18	15	Erysipelas	35	20	28
15	Inflam. of bowels	22	22	17	Intermittent fever	28	18	20	Scarlet fever	18	16	19
16	Remittent fever	24	17	14	Remittent fever	22	14	17	Remittent fever	22	11	17
17	Whooping-cough	13	14	5	Typhoid fev. (ent.)	8	8	5	Cholera morbus	9	9	6
18	Dysentery	13	13	9	Dysentery	11	7	6	Typhoid fev. (ent.)	7	8	8
19	Typhoid fev. (ent.)	11	11	5	Whooping-cough	11	7	4	Whooping-cough	12	8	4
20	Diphtheria	14	9	4	Cerebro-spi. men.	6	5	7	Diphtheria	10	6	10
21	Cholera morbus	7	9	3	Cholera morbus	7	5	1	Cerebro-spi. men.	7	5	18
22	Cholera infantum	4	6	4	Diphtheria	12	5	8	Puerperal fever	8	5	10
23	Puerperal fever	9	6	3	Puerperal fever	8	3	6	Dysentery	12	4	10
24	Typho-mal. fever	5	4	3	Cholera infantum	3	3	3	Typho-mal. fever	3	3	0
25	Inflam of brain	7	4	7	Inflam. of brain	9	2	8	Inflam. of brain	9	2	4
26	Cerebro-spi. men.	5	3	3	Typho-mal. fever	3	1	1	Cholera infantum.	3	2	2
27	Membran. croup	8	1	2	Membran. croup	8	1	6	Smallpox	1	1	3
28	Smallpox	0.3	0	0	Smallpox	0.6	0	0	Membran. croup	6	0	2
	Observers§	98	102	111	Observers§	101	111	104	Observers§	98	102	114

Line number.	April.				May.				June.			
	Diseases.	Av. '90-99.	1900.	1899.	Diseases.	Av. '90-99.	1900.	1889.	Diseases.	Av. '90-99.	1900.	1899.
	Average	31	27	26	Average	30	29	26	Average	29	26	23
1	Influenza	77	78	72	Rheumatism	82	85	76	Rheumatism	79	78	74
2	Bronchitis	79	76	70	Neuralgia	76	76	76	Neuralgia	72	73	68
3	Neuralgia	80	75	73	Bronchitis	71	74	69	Bronchitis	64	60	55
4	Rheumatism	83	75	77	Tonsillitis	69	72	65	Diarrhea	60	58	59
5	Tonsillitis	73	69	70	Influenza	61	62	50	Tonsillitis	60	58	55
6	Pneumonia	54	47	42	Measles	26	50	25	Influenza	41	41	32
7	Measles	25	44	21	Diarrhea	48	49	46	Inflam. of kidney	32	38	30
8	Pleuritis	38	40	32	Inflam. of kidney	36	44	35	Measles	24	36	19
9	Diarrhea	46	39	46	Pleuritis	34	40	35	Consumption, pul.	41	31	32
10	Inflam. of kidney	35	33	31	Pneumonia	41	39	31	Pleuritis	27	28	21
11	Consumption, pul.	45	24	30	Consumption, pul.	44	33	28	Intermittent fever	40	26	29
12	Intermittent fever	37	22	30	Intermittent fever	39	31	36	Inflam. of bowels	28	23	23
13	Scarlet fever	19	20	15	Inflam. of bowels	25	30	17	Cholera morbus	27	22	23
14	Erysipelas	32	20	20	Erysipelas	34	24	22	Dysentery	20	21	16
15	Inflam. of bowels	22	19	19	Scarlet fever	18	20	13	Scarlet fever	15	21	8
16	Remittent fever	25	17	20	Remittent fever	27	19	21	Remittent fever	29	20	21
17	Dysentery	12	12	6	Dysentery	14	18	12	Erysipelas	32	19	19
18	Typhoid fev. (ent).	6	9	5	Cholera morbus	14	9	16	Cholera infantum.	17	17	13
19	Cholera morbus	9	8	7	Whooping-cough	14	8	4	Pneumonia	24	15	13
20	Cholera infantum	3	7	3	Cholera infantum	8	6	3	Typhoid fev. (ent.)	9	8	10
21	Cerebro-spi. men.	6	5	14	Diphtheria	10	6	6	Whooping-cough	14	8	4
22	Puerperal fever	9	5	5	Inflam. of brain	9	6	6	Diphtheria	9	7	5
23	Whooping cough	14	4	4	Smallpox	0.3	5	0	Puerperal fever	8	6	4
24	Inflam. of brain	9	3	11	Cerebro-spi. men.	6	3	13	Cerebro-spi. men.	6	3	8
25	Diphtheria	9	2	4	Typhoid fev. (ent.)	7	3	9	Smallpox	0.6	2	0.8
26	Smallpox	1	1	3	Typho-mal. fever	4	3	0	Inflam. of brain	9	0.8	5
27	Membran. croup	6	0	0.9	Membran. croup	5	2	2	Typho-mal. fever	4	0.8	4
28	Typho-mal. fever	4	0	0	Puerperal fever	9	1	9	Membran. croup	2	0	0
	Observers§	92	99	111	Observers§	104	108	127	Observers§	108	126	130

*, †, ‡. These notes are on the preceding page. § The numbers in this line state how many

reported present by months in each of the years 1899-1900,† and the average by months 10 years, 1890-99.

Per cent of observers by whom the diseases were reported present.‡

July.				August.				September.				
Diseases.	Av. '90-99.	1900.	1899.	Diseases.	Av. '90-99.	1900.	1899.	Diseases.	Av. '90-99.	1900.	1899.	Line number.
Average	31	27	24	Average	33	31	27	Average	33	31	28	
Rheumatism	77	75	73	Diarrhea	88	89	85	Diarrhea	87	88	83	1
Diarrhea	77	74	66	Rheumatism	76	76	72	Rheumatism	78	71	73	2
Neuralgia	72	74	66	Neuralgia	72	68	67	Dysentery	59	66	64	3
Tonsillitis	59	58	52	Dysentery	58	65	61	Cholera infantum	50	66	41	4
Bronchitis	57	55	53	Cholera infantum	54	62	51	Neuralgia	72	62	67	5
Cholera morbus	51	37	35	Cholera morbus	73	62	53	Cholera morbus	56	58	47	6
Dysentery	37	35	37	Tonsillitis	58	59	53	Tonsillitis	57	55	58	7
Inflam. of kidney	32	35	28	Bronchitis	57	54	50	Bronchitis	64	52	60	8
Consumption, pul.	41	34	30	Inflam. of kidney	29	33	27	Influenza	40	41	29	9
Influenza	31	33	18	Consumption, pul.	40	30	26	Typhoid fev. (ent.)	28	38	21	10
Cholera infantum	38	28	25	Intermittent fever	46	30	33	Intermittent fever	46	33	30	11
Inflam. of bowels	30	26	28	Inflam. of bowels	37	30	35	Consumption, pul.	39	30	27	12
Measles	17	25	17	Influenza	31	29	22	Inflam. of kidney	28	27	31	13
Intermittent fever	45	22	33	Typhoid fev. (ent.)	23	28	21	Inflam. of bowels	31	26	30	14
Erysipelas	28	21	17	Pleuritis	19	26	19	Pleuritis	24	24	20	15
Pleuritis	23	20	20	Remittent fever	37	24	28	Remittent fever	38	21	30	16
Typhoid fev. (ent.)	14	18	12	Scarlet fever	12	20	8	Erysipelas	24	17	9	17
Scarlet fever	13	18	10	Erysipelas	25	18	18	Scarlet fever	13	17	13	18
Remittent fever	35	17	23	Measles	8	13	6	Pneumonia	19	11	19	19
Pneumonia	28	13	7	Whooping-cough	16	13	6	Typho-mal. fever	14	10	4	20
Whooping-cough	16	11	7	Typho-mal. fever	13	12	6	Whooping-cough	14	9	9	21
Typho-mal. fever	8	7	5	Pneumonia	14	10	6	Measles	4	7	5	22
Puerperal fever	6	5	5	Diphtheria	8	8	3	Diphtheria	10	7	5	23
Diphtheria	8	4	0	Puerperal fever	6	4	5	Puerperal fever	6	6	3	24
Inflam. of brain	9	3	3	Inflam. of brain	8	4	4	Inflam. of brain	7	4	0.9	25
Smallpox	0.2	2	0	Cerebro-spi. men.	5	3	0.9	Cerebro-spi. men.	5	4	4	26
Cerebro spi. men.	5	1	5	Smallpox	0.2	1	0	Membran. croup	2	2	2	27
Membran. croup	2	0.7	0.9	Membran. croup	2	0.7	0	Smallpox	0.1	0	0	28
Observers§	110	141	115	Observers§	109	136	109	Observers§	110	141	107	

October.				November.				December.				
Diseases.	Av. '90-99.	1900.	1899.	Diseases.	Av. '90-99.	1900.	1899.	Diseases.	Av. '90-99.	1900.	1899.	
Average	31	31	23	Average	30	26	25	Average	30	26	25	
Diarrhea	74	79	59	Neuralgia	76	73	70	Rheumatism	81	77	78	1
Neuralgia	75	76	65	Rheumatism	80	68	74	Neuralgia	76	77	72	2
Rheumatism	79	74	69	Tonsillitis	71	63	67	Influenza	76	68	60	3
Tonsillitis	67	66	58	Bronchitis	73	63	66	Bronchitis	77	67	70	4
Bronchitis	68	59	58	Diarrhea	51	58	53	Tonsillitis	76	67	71	5
Typhoid fev. (ent.)	31	48	33	Influenza	62	47	52	Diarrhea	46	39	48	6
Dysentery	42	46	31	Typhoid fev. (ent.)	25	42	29	Pneumonia	47	38	29	7
Influenza	47	45	33	Inflam. of kidney	32	33	33	Typhoid fev. (ent.)	16	38	16	8
Intermittent fever	43	42	28	Pneumonia	39	29	24	Pleuritis	36	33	36	9
Cholera morbus	30	40	19	Intermittent fever	37	29	27	Inflam. of kidney	32	30	29	10
Remittent fever	37	32	25	Consumption, pul.	38	28	31	Consumption, pul.	38	28	36	11
Consumption, pul.	36	31	24	Scarlet fever	17	27	13	Scarlet fever	20	25	14	12
Inflam. of kidney	31	31	23	Remittent fever	33	27	20	Inflam. of bowels	23	23	17	13
Cholera infantum	25	30	17	Pleuritis	32	20	38	Remittent fever	28	22	19	14
Inflam. of bowels	26	25	19	Erysipelas	28	18	22	Erysipelas	32	19	25	15
Scarlet fever	15	24	10	Inflam. of bowels	21	17	20	Intermittent fever	31	19	22	16
Erysipelas	25	22	13	Diphtheria	14	16	7	Diphtheria	15	14	9	17
Pneumonia	26	21	15	Dysentery	19	14	17	Dysentery	12	10	9	18
Pleuritis	27	21	22	Cholera morbus	14	9	11	Cholera morbus	8	9	4	19
Diphtheria	13	14	6	Typho-mal. fever	9	8	3	Smallpox	0	7	0	20
Typho-mal. fever	14	9	4	Cholera infantum	7	8	7	Measles	8	6	11	21
Inflam. of brain	7	9	0.9	Measles	6	5	9	Typho-mal. fever	7	5	3	22
Measles	3	9	4	Whooping-cough	12	4	8	Puerperal fever	6	5	1	23
Cerebro-spi. men.	3	5	4	Inflam. of brain	7	3	2	Membran. croup	8	4	4	24
Whooping-cough	9	5	5	Puerperal fever	7	3	5	Cerebro-spi. men.	4	3	4	25
Puerperal fever	6	3	5	Smallpox	0.2	3	1	Whooping-cough	11	3	10	26
Smallpox	0.4	2	0.9	Membran. croup	7	3	5	Cholera infantum	4	2	2	27
Membran. croup	5	2	2	Cerebro-spi. men.	3	0.8	2	Inflam. of brain	8	0.9	4	28
Observers§	108	117	113	Observers§	106	120	102	Observers§	102	117	102	

observers reported for the month in the given year.

TABLE 5.—WEEKLY REPORTS OF DISEASES IN MICHIGAN IN 1900.—*Exhibiting for the year and for each month of the year ending December 29, 1900, a summary relative to diseases in the State of Michigan; also for each month a summary relative to diseases in each of 11 geographical divisions* of the State.—Indicating the prevalence as regards time and area. Compiled from 5,513 weekly reports by 210 health officers of cities and villages, and voluntary correspondents of the State Board of Health, reporting the diseases under their observation.*

Number of observers, reports, etc.†	Diseases.	Average per cent of observers reporting presence of. b	Average per cent of weeks reported present where present. c	Per cent of reports stating presence of. d	Average order of prevalence where present. e	Average order of prevalence where present.										
						1899.	1898.	1897.	1896.	1895.	1894.	1893.	1892.	1891.	1890.	Av. 1890-1899
ending December 29, 1900. localities represented, 185. localities represented per month, 112. observers during the year, 210. observers per month, 118. reports compiled, 5,513. a reports per month, 459.	Average for tabulated diseases reported present.	28	65	18	2.8	2.8	2.6	2.7	2.7	3.0	3.0	3.3	3.1	3.3	3.3	3.0
	Brain, inflammation of	3	37	1	3.3	3.7	3.6	3.4	4.1	4.0	4.8	4.3	3.9	4.9	5.4	4.2
	Bowels, inflammation of	24	46	11	3.7	3.6	3.3	3.3	3.5	3.6	3.8	4.0	4.1	4.3	4.4	3.8
	Bronchitis	64	76	49	2.6	2.5	2.5	2.6	2.4	2.6	2.6	2.5	2.6	2.7	2.6	2.6
	Cerebro-spinal meningitis	3	39	1	3.6	3.3	3.2	3.4	3.6	3.7	3.9	4.4	3.7	5.3	4.7	3.9
	Cholera infantum	22	54	12	3.0	3.1	2.8	2.9	2.9	3.0	3.3	3.4	3.6	3.6	3.5	3.2
	Cholera morbus	25	55	14	2.9	2.9	2.7	3.0	2.9	3.0	3.3	3.3	3.4	3.4	3.5	3.1
	Consumption, pulmonary	30	81	25	3.0	2.9	2.9	3.1	3.0	3.5	3.4	3.5	3.7	3.8	3.5	3.3
	Croup, membranous	1	32	0.4	4.0	3.7	3.6	2.9	3.9	4.6	4.5	4.1	4.7	4.4	4.6	4.1
	Diphtheria	8	43	4	3.5	3.4	3.1	2.9	3.7	4.4	3.5	3.4	3.5	4.4	4.2	3.7
	Diarrhea	59	67	40	2.4	2.5	2.4	2.5	2.5	2.5	2.5	2.6	2.6	2.7	2.9	2.6
	Dysentery	28	49	14	3.2	3.0	3.0	3.2	3.0	3.2	3.3	3.6	3.8	3.8	3.8	3.4
	Erysipelas	20	48	10	3.7	3.7	3.3	3.4	3.5	3.7	3.8	3.9	4.1	4.2	4.1	3.8
	Fever, intermittent	27	58	16	2.9	2.9	2.6	2.7	2.7	2.9	2.9	2.9	3.0	3.2	2.9	2.9
	Fever, remittent	20	54	11	3.2	3.3	2.9	3.2	2.9	3.1	3.1	2.9	2.9	3.3	3.2	3.1
	Fever, typhoid (enteric)	22	66	15	2.8	2.9	2.9	3.3	3.3	3.4	3.6	3.2	3.6	3.5	3.8	3.4
	Fever, typho-malarial	5	45	3	3.0	2.6	3.1	2.7	2.8	3.2	3.7	3.6	3.7	3.6	3.6	3.3

For the year

Whole number of
Average number of
Whole number of
Average number of
Total number of
Average number of

Influenza	54	73	40	2.1	1.7	1.7	1.8	1.8	2.0	2.2	2.0	2.1	2.0	2.2	2.0
Kidney, inflammation of	34	59	20	3.5	3.4	3.2	3.4	3.5	3.6	3.7	3.7	3.6	3.9	4.1	3.6
Measles	23	57	13	2.4	2.3	2.7	2.3	2.7	3.1	2.8	2.8	3.3	3.0	3.0	2.8
Neuralgia	73	76	56	2.5	2.4	2.3	2.4	2.3	2.5	2.5	2.5	2.5	2.8	2.7	2.5
Pleuritis	30	53	16	3.7	3.6	3.3	3.6	3.4	3.8	3.8	3.8	4.0	4.1	4.2	3.8
Pneumonia	30	51	16	3.6	3.5	3.2	3.4	3.2	3.7	3.7	3.6	3.7	4.0	3.9	3.6
Puerperal fever	4	34	2	3.4	3.5	3.1	3.1	3.2	3.5	3.9	3.8	4.1	4.5	4.5	3.7
Rheumatism	76	82	63	2.3	2.3	2.2	2.3	2.3	2.7	2.6	2.6	2.7	2.9	2.9	2.6
Scarlet fever	21	55	12	3.0	3.1	2.7	3.0	3.1	3.5	3.3	3.6	3.2	4.2	4.2	3.4
Smallpox	2	57	1	2.7	4.7	2.0	2.0	6.3	2.8	4.1	4.8	5.0	0	6.5	3.8
Tonsillitis	65	69	45	2.9	2.7	2.7	2.6	2.6	3.0	3.0	2.8	2.9	3.3	3.4	2.9
Whooping-cough	8	55	5	2.5	2.3	2.4	2.1	2.4	2.6	2.9	3.0	3.0	2.9	3.2	2.7

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* The counties in each division are shown on maps of the State, on pages 201 and 217 of the report of this Board for 1886.

† The names of observers, and number of reports received from each, are shown in Table 2.

a Not every one of the observers sent in a report for every week; so that the number of reports received does not equal the number of observers multiplied by the number of weeks.

b The numbers in this column (pages 74-77) state not what per cent of the whole number of observers for the year reported the disease present at some time during the year, but the average (for the twelve months) of the per cents (of observers making reports for the several months) by which the disease was reported present in those months. The column for the year is thus a statement for an average *month*. But on pages 76 and 77 the numbers in the "per cent of observers" column are statements for the month, and not averages. This column indicates the area of prevalence except that in a few instances there were two or more observers in one city or village.

c This column states for the year or given month, what per cent the number of reports which stated a disease to be present is of the number of card-reports received, for the given time, from such of the observers as reported the diseases present. It is, therefore, an average, not for all localities represented, but only for those at which the given disease was reported present. In the line "average for tabulated diseases" it states what per cent the number of times *all* diseases were reported present is of the number of times they *might have been* so reported on the cards received, for the time specified, from the observers who during that time reported the diseases present (that is, if each of the observers had on every card he sent reported every disease present which he reported present at all). It will be seen that this is a more accurate average than would be obtained by dividing the sum of the column by the number of diseases reported present.

d This column states what per cent the number of reports stating presence of a disease is of the whole number of reports received for the time specified, from *all observers* in the State or Division, as the case may be. It combines, and states, in a general way, an idea of the *time* a disease was prevalent, with an idea of the area of its prevalence. Had every observer sent a report every week of the month or year, the numbers in this column would be (for the State) the product of the numbers in the same line in the two preceding columns.

e The disease having the greatest number of cases was to be marked 1 in the order; the disease having the next greatest number of cases, 2; and so on. Diseases not present were to be marked 0. The numbers in this column are found by dividing the totals (for the State) of the order of prevalence column, in Table 3 (a table giving statements for each locality, omitted in printing this report, for want of room), by the number of observers who reported the disease present. The column is, therefore, an average, not for all the localities represented, but only for those at which the given disease was reported present. The numbers in the "average" lines for this column are found by dividing the sum of the totals in the order of prevalence columns, in Table 3, for all diseases reported present, by the sum of the numbers of observers who reported the different diseases present, thus counting each observer once for every disease he reported present. As a rule, small numbers in this column indicate a large prevalence of the disease, and *vice versa*; but the greater the number of diseases reported present by each observer from week to week, the greater will be the "average" in this column.

TABLE 5.—CONTINUED.—*Diseases in the State, 1900.* (*Foot-notes and full tabular heads are on the two preceding pages.*)

Months.†	January.†				February.†				March.†				April.†				May.†				June.†			
Diseases.	Per cent of observers reporting presence of. b	Average per cent of weeks reported present where present. a, c.	Per. cent of reports stating presence of. d	Average order of prevalence where present. e	Per cent of observers reporting presence of. b	Average per cent of weeks reported present where present. a, c	Per cent of reports stating presence of. d	Average order of prevalence where present. e	Per cent of observers reporting presence of. b	Average per cent of weeks reported present where present. a, c	Per cent of reports stating presence of. d	Average order of prevalence where present. e	Per cent of observers reporting presence of. b	Average per cent of weeks reported present where present. a, c	Per cent of reports stating presence of. d	Average order of prevalence where present. e	Per cent of observers reporting presence of. b	Average per cent of weeks reported present where present. a, c	Per cent of reports stating presence of. d	Average order of prevalence where present. e	Per cent of observers reporting presence of. b	Average per cent of weeks reported present where present. a,c	Per cent of reports stating presence of. d	Average order of prevalence where present. e
Av. for tab. dis. rep. pres......	29	63	18	3.0	26	71	19	3.0	27	71	19	3.0	27	69	19	3.0	29	60	18	2.7	26	63	16	2.5
Brain, inflammation of.........	4	35	1	3.3	2	43	0.7	4.5	2	29	0.5	2.0	3	36	1	4.7	6	33	2	3.5	0.8	50	0.5	5.0
Bowels, inflammation of.......	22	43	9	3.9	18	45	8	4.1	22	40	8	4.3	19	54	11	4.2	30	41	12	3.3	23	47	11	3.2
Bronchitis......................	72	81	57	2.3	74	86	64	2.3	74	88	65	2 4	76	83	63	2.5	74	71	53	2.4	60	68	41	2.4
Cerebro-spinal meningitis.....	3	33	1	3.0	5	39	2	5.8	5	44	2	3.8	5	39	2	3.2	3	64	2	2.3	3	38	1	2.3
Cholera infantum.............	6	36	2	3.3	3	60	1	4.7	2	38	0.8	4.5	7	37	3	2.9	6	30	2	4.0	17	49	9	3.1
Cholera morbus...............	9	33	3	4.1	5	29	1	4.8	9	35	3	3.9	8	36	3	3.1	9	43	4	2.9	22	47	11	2.7
Consumption, pulmonary......	35	78	27	3.4	32	80	26	3.4	25	91	22	3.6	24	80	20	3.5	33	67	23	2.8	31	82	26	2.3
Croup, membranous...........	1	20	0.2	13.0	1	25	0.2	3 0	0	0	0	0	0	0	0	0	2	25	0.4	2.0	0	0	0	0
Diphtheria......................	9	30	3	5.4	5	37	2	2.8	6	36	2	3.3	2	50	1	3.5	6	43	3	4.3	7	47	4	2.6
Diarrhea........................	44	46	20	3.2	32	47	15	3.8	37	51	19	3.7	39	58	24	3.3	49	52	25	2.9	58	60	36	2.4
Dysentery	13	30	4	4.0	7	39	3	3.9	4	43	2	4.3	12	27	3	3.8	18	32	5	3.6	21	40	9	2.8
Erysipelas	27	49	13	4.2	22	52	11	4.0	20	57	11	4.8	20	50	10	3.6	24	45	11	3.5	19	49	10	2.7
Fever, intermittent...........	23	53	12	3.5	18	68	12	3.4	22	55	12	3.8	22	60	13	3.3	31	46	15	2.6	26	58	15	2.4
Fever, remittent..............	17	56	9	4.2	14	53	7	4.3	11	11	1	3.7	17	58	10	3.8	19	43	8	3.2	20	46	9	2.6
Fever, typhoid (enteric)........	11	55	6	3.4	8	67	5	2.4	8	63	5	3.8	9	66	6	3.0	3	77	2	2.0	8	53	4	2.7
Fever, typho-malarial..........	4	21	0.8	3.0	1	33	0 2	3.0	3	50	1	2.3	0	0	0	0	3	31	0.8	4.3	0.8	25	0.2	2.0
Influenza	79	75	60	1.9	74	87	64	1.9	79	83	65	1.7	78	82	63	1.8	62	70	44	2.2	41	65	29	2.5
Kidney, inflammation of......	43	54	23	3.6	32	68	22	4.0	33	66	22	4 0	33	67	23	3.8	44	54	24	3.0	38	54	21	2.7
Measles.........................	26	55	15	2.5	31	62	19	2.2	36	84	31	2.4	44	63	28	2.4	50	51	25	2.2	36	63	23	1.8
Neuralgia	75	77	57	2.4	76	79	60	2.6	78	80	62	2.6	75	82	62	2.7	76	79	61	2.1	73	72	53	2.3
Pleuritis........................	42	50	21	4.0	39	63	24	3.9	36	64	23	3.9	40	54	22	4.0	40	49	20	3.3	28	51	15	3.7
Pneumonia	52	50	26	3.9	52	62	33	3.6	55	60	33	3.6	47	52	25	3.7	39	49	19	3.3	15	46	7	3.8
Puerperal fever...............	6	28	2	4.7	3	50	1	3.3	5	60	3	3.2	5	28	1	4.0	1	50	0.4	5.0	6	26	2	2.7
Rheumatism....................	83	82	68	2.3	77	85	66	2.4	81	87	71	2.4	75	87	66	2.4	85	80	68	2.1	78	86	67	1.8
Scarlet fever....................	25	61	16	3.5	21	60	13	2.7	16	56	9	3.3	20	55	12	3.7	20	50	11	2.5	21	49	11	2.6
Smallpox........................	0	0	0	0	0	0	0	0	1	25	0.3	3.0	1	75	0.9	3.0	5	43	2	3.0	2	91	2	1.0
Tonsillitis	74	74	54	2.8	72	76	54	2.9	73	77	55	3.0	69	74	52	3.0	72	65	47	2 7	58	69	41	2.6
Whooping-cough...............	14	53	7	2.9	7	73	5	3.0	8	62	5	2.6	4	63	3	3.3	8	53	4	1.8	8	62	5	1.8

	July.†				August.†				September.†				October.†				November.†				December.†			
Av. for tab. dis. rep. pres.	27	62	17	2.5	31	61	19	2.8	31	67	21	3.1	31	61	19	2.8	26	68	18	2.8	26	68	18	2.9
Brain, inflammation of	3	50	1	3.0	4	32	1	3.8	4	40	2	3.0	9	28	2	2.4	3	56	2	3.5	0.9	50	0.2	3.0
Bowels, inflammation of	26	48	12	3.1	30	51	15	3.5	26	53	14	4.1	25	42	11	3.8	17	37	6	3.8	23	45	10	3.7
Bronchitis	55	65	36	2.1	54	60	32	3.3	52	71	37	3.5	59	73	43	2.6	63	79	51	2.5	67	87	57	2.3
Cerebro-spinal meningitis	1	43	0.6	3.0	3	50	2	3.5	4	29	1	4.0	5	24	1	2.2	0.8	25	0.2	5.0	3	40	1	5.0
Cholera infantum	28	58	17	2.8	62	57	36	2.6	66	65	43	2.9	30	42	13	3.3	8	29	2	4.2	2	50	0.7	1.5
Cholera morbus	37	60	22	2.4	62	63	39	2.5	58	66	39	3.0	40	49	20	3.2	9	48	5	3.0	9	33	3	3.5
Consumption, pulmonary	34	82	28	2.6	30	87	27	2.9	30	81	26	3.4	31	84	27	3.1	28	84	24	3.0	28	83	24	3.1
Croup, membranous	0.7	25	0.2	3.0	0.7	20	0.2	3.0	2	27	0.6	4.3	2	33	0.6	3.0	3	42	1	2.3	4	39	2	4.8
Diphtheria	4	42	2	3.0	8	27	2	3.4	7	46	4	4.0	14	45	6	3.2	16	56	9	3.2	14	44	6	3.6
Diarrhea	74	70	52	1.9	89	81	72	1.6	88	84	75	1.6	79	73	57	2.0	58	58	34	2.9	39	64	24	3.4
Dysentery	35	46	18	2.9	65	56	36	3.0	66	63	42	3.0	46	48	22	3.4	14	43	6	3.9	10	29	3	3.8
Erysipelas	21	50	11	3.0	18	41	8	3.8	17	54	10	3.9	22	41	9	3.6	18	51	9	4.3	19	48	9	3.7
Fever, intermittent	22	53	12	2.5	30	63	18	2.9	33	68	23	3.0	42	57	24	2.5	29	62	19	2.3	19	62	13	3.0
Fever, remittent	17	52	9	2.9	24	45	11	3.1	21	65	14	3.4	32	57	18	2.6	27	56	15	2.9	22	64	15	3.2
Fever, typhoid (enteric)	18	58	11	2.5	28	57	16	2 9	38	71	27	3.0	48	68	33	2.8	42	75	32	2.4	38	70	27	2.8
Fever, typho-malarial	7	56	4	3.2	12	47	6	3.1	10	42	4	3.2	9	42	4	2.9	8	63	5	2.1	5	42	2	3.3
Influenza	33	57	19	2.6	29	56	17	2.8	41	63	26	2.7	45	63	29	2.2	47	73	36	2.1	68	78	52	1.9
Kidney, inflammation of	35	63	22	3.0	33	54	18	3.2	27	60	17	4.0	31	56	17	3.4	33	64	21	3.8	30	53	16	3.8
Measles	25	52	14	2.0	13	49	6	2.7	7	50	4	3.7	9	43	4	2.8	5	63	3	3.2	6	70	4	3.7
Neuralgia	74	68	49	2.3	68	70	47	2.8	62	76	49	2.9	76	73	55	2.5	73	79	58	2.3	77	77	59	2.5
Pleuritis	20	47	10	3.3	26	36	10	3.8	24	48	12	4.3	21	53	11	3.5	20	62	12	3.1	33	61	20	3.8
Pneumonia	13	38	5	2.7	10	43	4	4.4	11	45	5	3.1	21	34	7	4.6	29	52	16	3.5	38	54	22	3.4
Puerperal fever	5	30	1	1.9	4	28	1	3 0	6	35	2	4.7	3	23	0.6	2.3	3	31	1	3.3	5	38	2	2.8
Rheumatism	75	78	59	2.1	76	75	57	2 5	71	84	61	2.8	74	80	59	2.3	68	86	60	2.1	77	81	63	2.2
Scarlet fever	18	53	9	2.2	20	47	10	2.6	17	53	10	3.0	24	51	13	3.6	27	64	17	2.9	25	60	15	3.1
Smallpox	2	64	1	2.3	1	30	0.5	3.5	0	0	0	0	2	50	0.9	3.0	3	63	2	3.0	7	63	5	2.9
Tonsillitis	58	65	38	2.6	59	59	35	3.2	55	63	36	3.5	66	63	41	3.0	63	74	48	2.8	67	76	50	2.9
Whooping cough	11	63	8	1.9	13	57	8	2.6	9	48	5	3.0	5	29	1	3.3	4	45	2	2.4	3	27	0.7	2.3

[Foot-note from page 71.]

‡ The numbers opposite the names of the diseases do not state what per cent of the whole number of observers for the year reported the disease present at some time during the year, but state (on an average for the twelve months of the year) by what per cent of the observers making reports for the several months, the disease was reported present in those months. The columns for each year is thus a statement for an average month of that year. On the two following pages of this table, however, the columns for each month state what per cent of the observers for that month (the number of whom is stated at the foot of the column) reported the given disease in that month.

TABLE 5.—CONTINUED.—*Diseases in the Upper Peninsula, the Northwestern, the Northern, and the Northeastern Divisions of the State for the year and by months in 1900; also an average for the period of 10 years, 1890-99,—indicating what per cent of the weekly reports received stated the presence of the diseases named.*d

Division.*	Diseases.	1890-1899.	1900.†	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Division.*	1890-1899.	1900.†	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	Av. for tab. dis. rep. pres.	21	21	22	21	28	22	24	22	17	18	20	20	20	20		21	15	10	10	8	11	8	15	16	20	19	15	19	16
Upper Peninsula Division.*	Brain, inflammation of	4	1	9	0	0	0	0	0	0	2	0	2	0	0	Northwestern Division.*	3	0.7	0	0	0	0	0	0	0	0	0	4	4	0
	Bowels, inflammation of	12	15	14	22	50	19	14	19	14	20	13	7	3	12		15	5	5	0	0	0	0	18	3	14	3	0	0	4
	Bronchitis	60	50	59	61	71	56	68	54	49	35	33	57	47	47		59	41	50	43	43	37	36	36	37	40	38	37	48	52
	Cerebro-spinal meningitis	3	4	9	0	0	0	0	0	0	7	3	2	3	12		2	2	0	0	0	16	7	7	0	0	0	0	0	0
	Cholera infantum	16	23	23	17	7	13	7	31	30	55	54	7	3	0		13	22	0	0	0	0	7	25	20	62	59	19	4	0
	Cholera morbus	15	8	9	6	0	0	4	8	3	16	23	7	0	6		14	20	0	0	0	0	0	21	27	62	48	11	4	0
	Consumption, pulmonary	37	54	36	39	50	44	43	54	49	45	56	65	72	74		33	24	0	0	0	21	7	29	30	31	28	37	30	35
	Croup, membranous	3	0.5	0	0	0	0	0	0	3	0	0	0	0	3		2	0	0	0	0	0	0	0	0	0	0	0	0	0
	Diphtheria	9	8	0	0	7	0	14	8	0	9	3	7	19	18		6	2	0	0	0	0	0	0	0	2	3	0	13	0
	Diarrhea	51	43	27	17	29	6	54	58	51	64	62	57	22	15		42	32	15	21	0	21	7	29	33	62	52	26	39	17
	Dysentery	17	19	0	0	14	13	29	31	14	35	38	15	6	12		17	13	0	7	0	0	0	4	17	43	21	15	0	4
	Erysipelas	13	6	23	22	14	0	11	0	8	4	3	2	0	9		15	10	0	21	0	16	0	14	17	10	10	4	9	17
	Fever, intermittent	2	2	0	0	0	0	0	0	0	0	0	11	3	0		23	6	0	0	0	0	0	14	10	10	14	4	9	0
	Fever, remittent	2	2	0	0	0	0	0	4	3	0	3	2	3	6		19	7	0	0	0	0	0	4	0	7	10	15	17	17
	Fever, typhoid (enteric)	26	35	18	17	7	25	0	12	16	25	41	72	72	56		8	28	0	0	0	0	0	11	17	24	69	63	57	52
	Fever, typho-malarial	1	0.3	0	0	7	0	0	0	0	0	0	0	0	0		4	1	0	0	0	0	0	0	0	0	3	4	0	4
	Influenza	44	32	50	61	86	100	82	15	14	9	18	13	22	32		43	21	50	43	43	37	21	11	13	12	10	4	13	35
	Kidney, inflammation of	19	25	36	33	29	38	21	31	24	11	23	28	31	18		19	10	0	0	0	5	0	14	17	12	3	7	26	17
	Measles	7	16	41	22	36	6	7	0	16	9	15	9	28	24		10	8	15	29	7	26	21	7	13	5	0	0	0	0
	Neuralgia	53	43	45	39	71	56	82	58	32	20	23	48	42	47		56	38	30	36	36	37	36	36	37	40	34	41	48	43
	Pleuritis	17	11	23	28	21	25	18	19	5	7	5	4	8	6		19	17	5	0	21	11	7	21	27	14	21	15	22	26
	Pneumonia	28	28	45	67	79	44	43	35	14	18	10	17	28	15		29	10	20	7	29	16	0	7	7	7	7	0	30	4
	Puerperal fever	5	3	5	6	50	6	0	0	0	0	0	0	0	6		4	1	0	0	0	0	0	4	3	0	3	0	4	0
	Rheumatism	51	53	59	39	43	69	79	85	62	51	51	39	36	35		56	41	35	29	29	37	36	64	63	48	24	33	30	39
	Scarlet fever	17	22	9	17	29	19	29	19	16	18	15	26	33	35		7	26	25	0	0	16	21	18	33	14	24	52	61	30
	Smallpox	0.1	7	0	0	0	0	0	0	0	0	0	11	28	35		0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tonsillitis	57	55	55	67	79	75	61	62	51	44	51	52	53	50		44	34	30	29	14	21	14	32	33	36	34	37	52	52
	Whooping-cough	17	8	32	11	0	0	0	15	11	7	8	2	11	0		4	4	0	7	7	0	0	0	3	5	10	4	0	4

	Av. for tab. dis. rep. pres.	21	25	23	22	24	24	26	25	28	26	30	25	23	25		23	23	19	23	25	27	27	22	22	26	24	20	23	22
Northern Division.*	Brain, inflammation of	11	3	0	0	0	4	10	8	5	0	0	4	0	0	Northeastern Division.*	2	3	0	13	0	0	0	0	7	0	0	0	15	0
	Bowels, inflammation of	13	16	26	7	0	7	7	16	23	26	39	11	11	18		22	34	25	13	8	50	39	25	36	60	44	40	23	25
	Bronchitis	64	81	74	93	86	78	100	76	77	71	65	79	79	93		64	70	75	80	100	92	100	69	64	47	38	33	69	75
	Cerebro-spinal meningitis	4	2	0	7	14	0	0	0	0	0	4	0	0	0		0.6	4	0	7	0	8	28	0	0	0	0	0	0	8
	Cholera infantum	8	16	0	0	0	4	0	12	45	45	52	21	5	0		4	10	0	0	0	0	0	31	14	40	31	0	0	0
	Cholera morbus	9	18	0	0	5	15	17	20	41	42	39	14	5	4		5	15	0	0	0	0	0	25	50	53	44	7	0	0
	Consumption, pulmonary	33	12	13	0	5	4	3	16	9	16	26	21	16	14		19	13	5	27	33	33	28	13	0	0	6	20	0	0
	Croup, membranous	2	0	0	0	0	0	0	0	0	0	0	0	0	0		0.4	0	0	0	0	0	0	0	0	0	0	0	0	0
	Diphtheria	6	0.7	0	0	0	0	0	0	0	0	0	0	11	0		9	3	0	0	0	0	17	0	7	0	0	0	0	8
	Diarrhea	27	45	30	7	14	19	38	52	86	84	70	54	32	36		41	51	15	27	25	58	50	56	71	87	94	53	46	33
	Dysentery	14	21	4	0	5	7	3	16	55	68	52	11	5	7		5	17	10	0	0	0	17	19	7	53	56	27	0	0
	Erysipelas	28	25	35	27	38	22	21	24	23	19	30	29	11	29		31	28	25	27	33	33	33	31	29	33	25	13	23	25
	Fever, intermittent	19	18	0	0	5	15	7	12	9	26	26	39	37	32		21	2	5	0	0	8	6	6	0	0	0	0	0	0
	Fever, remittent	14	22	0	0	0	22	21	16	18	16	35	57	32	36		5	21	20	27	33	0	0	13	29	20	25	33	31	33
	Fever, typhoid (enteric)	7	10	0	0	14	7	0	0	9	6	26	18	32	14		1	2	0	0	0	0	0	0	0	0	6	0	15	0
	Fever, typho-malarial	3	0	0	0	0	0	0	0	0	0	0	0	0	0		2	0.6	0	0	0	0	0	0	0	0	6	0	0	0
	Influenza	48	39	61	67	76	63	48	44	23	19	13	7	11	50		61	45	60	53	67	67	50	38	29	33	25	33	31	58
	Kidney, inflammation of	24	29	48	47	43	30	31	28	50	29	22	11	16	7		47	44	30	27	33	50	50	50	36	60	44	47	62	42
	Measles	7	20	0	0	5	37	45	52	50	6	17	14	0	0		7	6	0	20	25	0	17	13	0	0	0	0	0	0
	Neuralgia	56	82	83	100	95	85	83	68	68	68	96	82	89	82		59	64	50	67	75	58	67	56	64	67	56	60	85	75
	Pleuritis	22	50	52	67	67	52	72	48	32	26	26	39	58	71		31	34	40	27	33	67	39	19	29	33	25	27	31	42
	Pneumonia	20	29	30	27	33	26	41	12	18	16	9	29	58	54		20	30	30	53	42	50	50	19	21	20	0	13	38	33
	Puerperal fever	4	2	0	0	0	4	0	4	0	0	9	0	5	0		2	0	0	0	0	0	0	0	0	0	0	0	0	0
	Rheumatism	67	87	96	93	86	85	97	92	77	81	91	82	79	82		64	81	75	93	100	92	89	63	71	67	88	80	92	75
	Scarlet fever	7	18	43	27	33	26	17	16	14	3	22	7	5	7		7	0	0	0	0	0	0	0	0	0	0	0	0	0
	Smallpox	0.2	0.7	0	0	0	0	0	0	0	0	0	0	0	7		0.1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tonsillitis	41	60	61	60	57	70	66	56	59	48	52	64	53	68		48	69	50	87	100	83	67	63	64	53	63	67	77	75
	Whooping-cough	5	3	0	0	0	0	0	0	0	23	4	0	0	0		4	1	10	0	0	0	0	0	0	0	0	0	0	0

*, †, d. These notes are on the first page of Table 5.

TABLE 5.—CONTINUED.—*Diseases in the Western, Northern Central, Bay and Eastern, and the Central Divisions of the State, for the year and by months in 1900; also an average for the period of 10 years, 1890-99—indicating what per cent of the weekly reports received stated the presence of the diseases named.*d

Division.*	Diseases.	1890-1899.	1900.†	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Division.*	1890-1899.	1900.†	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	Av. for tab. dis. rep. pres.	21	17	19	18	20	18	14	16	14	15	19	18	16	17		17	16	17	16	18	13	12	16	15	15	21	19	12	18
Western Division.*	Brain, inflammation of	3	1	5	0	0	0	0	0	3	6	3	2	0	0	Northern Central Division.*	3	2	0	4	0	0	0	0	0	6	5	11	0	0
	Bowels, inflammation of	14	7	0	6	8	3	7	9	8	10	0	14	5	9		5	11	4	0	5	0	6	29	26	12	10	21	7	17
	Bronchitis	47	46	50	57	59	65	40	25	32	29	22	47	52	60		43	43	59	50	41	50	14	33	21	24	40	58	50	67
	Cerebro-spinal meningitis	3	0.6	0	4	0	0	0	0	3	0	0	0	0	0		1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cholera infantum	9	7	0	0	0	0	0	3	8	33	41	10	0	0		11	6	0	0	0	0	0	0	0	24	45	5	0	0
	Cholera morbus	12	7	4	0	3	0	0	0	8	26	31	12	0	0		10	14	0	4	0	0	14	29	21	18	45	32	0	0
	Consumption, pulmonary	29	27	41	35	31	28	24	22	22	31	38	27	19	9		31	7	22	13	18	0	0	0	5	0	0	0	0	8
	Croup, membranous	3	0	0	0	0	0	0	0	0	0	0	0	0	0		0.7	0	0	0	0	0	0	0	0	0	0	0	0	0
	Diphtheria	7	3	7	6	0	0	0	3	0	0	3	4	0	5		3	0.9	0	4	5	0	0	0	0	0	0	0	0	0
	Diarrhea	41	29	14	4	15	15	16	31	35	57	84	51	33	14		35	35	7	13	18	17	21	24	42	82	100	37	21	50
	Dysentery	15	8	2	6	0	0	2	9	14	17	31	16	2	0		14	8	0	0	5	8	0	5	11	12	25	21	0	8
	Erysipelas	16	13	11	16	23	10	9	13	14	7	6	14	12	16		12	8	22	0	5	8	7	0	21	6	10	0	0	8
	Fever, intermittent	31	14	9	14	13	13	9	9	14	10	19	31	14	9		34	42	30	25	45	25	36	29	37	71	56	68	36	50
	Fever, remittent	32	17	21	12	15	18	13	19	14	14	13	22	24	14		22	24	22	13	14	33	14	19	11	24	40	47	29	42
	Fever, typhoid (enteric)	7	8	0	0	10	5	0	6	5	5	13	12	19	19		11	10	0	17	23	0	0	0	0	0	20	21	21	25
	Fever, typho-malarial	5	3	2	0	0	0	0	0	5	14	3	6	2	5		3	5	0	4	18	0	0	0	0	18	10	11	0	0
	Influenza	49	50	63	57	77	65	53	41	24	21	31	45	55	58		30	33	44	46	55	33	14	43	21	0	20	32	21	50
	Kidney, inflammation of	24	13	14	16	10	18	18	9	3	12	16	10	17	9		10	14	15	13	18	25	14	10	11	0	5	32	7	17
	Measles	7	18	30	41	54	30	20	22	8	7	0	0	0	0		7	17	7	21	18	25	29	52	26	18	0	0	0	0
	Neuralgia	61	59	57	55	49	78	51	56	54	55	53	53	67	77		48	36	37	50	36	33	21	29	26	35	45	37	43	33
	Pleuritis	19	12	18	20	23	25	2	19	3	2	9	4	5	12		8	18	19	21	18	25	7	19	21	0	20	21	21	25
	Pneumonia	25	11	23	24	31	15	7	0	0	0	3	0	2	14		17	16	22	42	45	17	0	10	0	6	5	5	0	25
	Puerperal fever	3	2	0	0	0	0	0	0	3	2	3	2	0	9		5	1	7	0	0	0	0	5	0	0	0	0	0	0
	Rheumatism	63	62	59	55	67	65	62	81	59	38	66	61	67	67		54	47	74	42	41	25	64	57	53	35	60	26	21	42
	Scarlet fever	9	9	20	10	8	20	20	9	0	0	0	6	2	7		7	9	19	25	18	0	14	10	5	0	0	0	0	0
	Smallpox	0.1	1	0	0	0	0	0	0	0	0	0	0	0	12		0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tonsillitis	44	45	54	53	49	45	40	44	30	33	44	51	48	42		36	42	59	54	55	33	43	38	42	12	25	32	50	42
	Whooping-cough	6	6	16	12	8	0	0	6	19	2	0	0	0	0		6	5	0	0	0	0	14	0	16	24	10	5	0	0

Bay and Eastern Division.*														
Av. for tab. dis. rep. pres.	19	17	17	19*	18†	17	16	12	18	20	21	18	15	14
Brain, inflammation of	2	0.6	2	0	0	0	3	0	0	0	0	1	0	0
Bowels, inflammation of	13	13	15	10	7	13	25	10	10	17	15	11	5	11
Bronchitis	50	48	58	61	61	63	48	34	36	31	47	50	48	52
Cerebro-spinal meningitis	3	2	2	0	0	5	0	2	0	3	4	4	0	2
Cholera infantum	12	16	7	6	0	0	6	10	30	37	53	16	0	2
Cholera morbus	14	15	3	0	4	3	5	9	30	39	49	20	2	2
Consumption, pulmonary	35	18	18	20	20	21	12	21	21	14	15	19	16	18
Croup, membranous	3	0.6	0	0	0	0	2	0	0	0	3	0	0	2
Diphtheria	11	4	0	0		0	0	7	0	4	1	11	14	11
Diarrhea	37	37	22	16	22	16	20	28	62	73	68	51	28	7
Dysentery	12	14	3	0	0	5	5	7	18	46	46	13	9	2
Erysipelas	12	11	5	8	11	5	18	16	13	11	12	8	16	5
Fever, intermittent	17	15	5	18	11	8	17	16	20	17	25	19	12	5
Fever, remittent	12	7	8	8	0	8	9	3	11	7	7	11	3	0
Fever, typhoid (enteric)	13	16	2	2	2	5	8	7	15	19	31	30	28	27
Fever, typho-malarial	5	4	0	0	0	0	0	0	8	7	4	6	10	5
Influenza	43	41	75	78	70	68	37	12	10	11	28	33	45	63
Kidney, inflammation of	13	18	27	24	20	18	18	10	28	19	19	13	14	11
Measles	8	13	0	18	28	32	22	33	21	11	3	4	0	0
Neuralgia	53	45	57	43	46	47	40	33	49	47	44	48	45	38
Pleuritis	19	17	23	35	28	24	22	9	16	13	12	15	7	9
Pneumonia	20	14	18	43	33	18	22	5	8	1	0	13	14	11
Puerperal fever	3	1	0	0	0	5	0	0	2	0	1	0	3	2
Rheumatism	58	53	57	57	65	47	52	45	44	64	50	54	50	52
Scarlet fever	11	9	12	14	11	5	0	3	7	13	6	13	7	14
Smallpox	0.4	0.1	0	0	0	0	0	0	0	1	0	0	0	0
Tonsillitis	42	44	48	61	65	50	51	28	39	41	32	34	43	46
Whooping-cough	9	3	10	14	9	3	0	0	0	1	3	1	0	0

Central Division.*														
Av. for tab. dis. rep. pres.	20	17	19	19	18	17	16	16	15	16	18	18	16	17
Brain, inflammation of	3	2	0	0	0	0	0.9	0	0	1	6	4	7	0
Bowels, inflammation of	12	9	10	4	8	7	8	8	7	10	11	11	8	11
Bronchitis	56	41	58	67	65	52	44	37	25	24	26	32	41	50
Cerebro-spinal meningitis	2	0.3	0	2	0	0	0	1	0	0	0	0.9	0	0
Cholera infantum	8	9	0	0	3	3	0.9	6	11	25	33	10	3	0
Cholera morbus	13	12	3	1	4	3	0	7	18	31	24	19	8	4
Consumption, pulmonary	35	36	40	41	28	28	34	34	39	38	35	36	33	40
Croup, membranous	2	0.3	1	0	0	0	0	0	0	0	0	0.9	2	0
Diphtheria	3	4	5	1	6	0	3	7	3	0	3	9	9	7
Diarrhea	42	39	23	18	24	25	23	41	44	68	69	57	27	23
Dysentery	13	14	8	6	0	3	5	10	14	34	40	27	3	1
Erysipelas	14	8	13	4	6	6	8	7	12	4	7	12	12	9
Fever, intermittent	25	16	24	16	19	14	13	10	7	18	21	24	17	11
Fever, remittent	21	10	9	7	6	7	7	12	9	8	9	14	17	17
Fever, typhoid (enteric)	12	15	7	2	0	7	0	4	16	21	22	34	29	24
Fever, typho-malarial	3	3	2	0	0	0	3	1	5	7	2	4	9	1
Influenza	46	35	53	63	53	46	35	24	20	19	23	32	26	45
Kidney, inflammation of	20	22	28	31	28	28	26	26	17	15	14	17	20	20
Measles	7	8	9	12	13	17	22	13	8	1	4	6	0	1
Neuralgia	64	53	62	67	64	58	56	60	44	39	44	49	51	54
Pleuritis	16	13	16	20	17	14	18	12	3	8	15	8	13	21
Pneumonia	20	12	21	28	26	28	14	4	2	0	5	2	8	24
Puerperal fever	2	2	2	1	6	0	0	2	1	0	5	0.9	1	2
Rheumatism	67	58	65	71	78	68	62	60	45	43	54	55	56	51
Scarlet fever	8	9	11	12	1	6	6	4	5	7	9	11	23	16
Smallpox	0.1	0.9	0	0	0	0	2	7	2	0	0	0	0	0
Tonsillitis	44	38	57	46	47	55	40	36	36	26	30	30	37	34
Whooping-cough	7	6	2	0	7	6	10	9	15	10	5	3	0	0

*, †, d. These notes are on the first page of Table 5.

TABLE 5.—CONTINUED.—*Diseases in the Southwestern and Southern Central Divisions of the State, for the year and by months in 1900; also an average for the period of 10 years, 1890-99—indicating what per cent of the weekly reports received stated the presence of the diseases named.*d

Division.*	Diseases.	1890-1899.	1900.†	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Division.*	1890-1899.	1900.†	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	Av. for tab. dis. rep. pres....	22	21	21	20	21	23	19	17	18	24	23	22	21	23		21	19	19	20	18	20	19	17	17	19	23	21	19	18
Southwestern Division.*	Brain, inflammation of.......	3	2	0	0	3	0	0	0	13	5	0	0	0	3	Southern Central Division.*	3	0.2	0	0	0	0	0	0	0	0.9	0	1	0	0
	Bowels, inflammation of.....	13	10	7	4	7	25	11	3	19	22	10	0	0	10		11	10	3	10	6	9	10	4	12	16	22	9	7	6
	Bronchitis..................	54	51	69	81	80	82	57	36	34	34	35	26	53	47		52	51	56	67	70	64	54	47	44	34	39	36	57	62
	Cerebro-spinal meningitis...	2	2	0	4	0	0	0	3	0	10	0	0	0	0		1	0.8	3	0	2	0	0	0	0	0	2	2	0	0
	Cholera infantum............	15	16	3	0	0	7	0	0	9	49	60	21	7	7		8	9	0	0	0	0	0	3	11	25	36	16	3	0
	Cholera morbus..............	17	21	3	4	7	7	5	12	22	71	45	24	10	10		16	18	1	1	3	2	5	7	26	42	54	34	10	5
	Consumption, pulmonary....	33	13	10	15	0	0	0	0	16	24	20	26	23	13		31	19	18	21	17	15	23	26	27	17	16	18	13	12
	Croup, membranous..........	3	0.3	0	0	0	0	0	0	0	0	0	0	0	3		1	0.1	0	1	0	0	0	0	0	0	0	0	0	0
	Diphtheria..................	3	1	3	0	0	0	0	0	0	2	3	0	7	0		5	4	1	1	3	7	1	1	5	3	5	7	7	3
	Diarrhea....................	36	45	17	22	37	36	27	27	56	76	75	66	47	33		41	43	21	10	11	25	24	28	51	73	86	78	45	34
	Dysentery...................	15	11	0	0	7	0	0	0	9	24	38	26	7	0		15	19	1	3	0	4	4	6	27	38	55	42	14	3
	Erysipelas..................	21	10	7	7	10	18	11	6	0	5	15	24	10	3		11	7	15	13	10	9	3	7	6	4	8	2	6	2
	Fever, intermittent..........	38	43	41	41	27	39	30	52	25	49	48	55	60	47		29	15	4	0	2	9	18	14	17	24	35	24	25	2
	Fever, remittent............	28	11	14	11	13	14	3	3	6	10	18	13	7	17		22	8	0	3	2	4	5	8	10	11	13	13	14	9
	Fever, typhoid (enteric).....	5	7	0	15	0	0	0	0	0	7	20	16	10	17		8	12	3	1	3	4	0	1	6	13	19	33	29	25
	Fever, typho-malarial........	4	4	3	0	0	0	0	0	16	10	0	0	10	10		3	2	0	0	0	0	1	0	1	5	8	5	1	0
	Influenza....................	54	57	72	89	83	75	59	45	34	27	43	58	60	67		46	47	69	73	73	84	53	42	20	18	31	29	46	62
	Kidney, inflammation of.....	19	31	28	11	37	39	46	39	38	32	23	24	27	23		16	18	26	22	22	16	19	17	20	14	12	13	19	12
	Measles.....................	8	10	14	0	7	25	30	27	6	12	0	0	0	3		8	16	23	18	22	51	38	25	10	4	2	2	6	6
	Neuralgia...................	61	73	72	70	83	89	78	67	72	61	60	74	80	83		66	68	69	79	79	65	70	63	54	58	69	76	71	69
	Pleuritis....................	16	9	24	15	20	11	3	6	6	5	5	0	3	17		15	13	21	28	13	20	24	8	4	7	4	7	4	20
	Pneumonia...................	23	13	38	26	23	29	0	3	0	0	10	5	7	30		22	12	21	30	19	22	23	3	4	2	2	6	7	18
	Puerperal fever.............	3	0.8	0	0	0	0	0	0	3	5	0	0	0	0		2	2	3	0	0	2	3	1	1	4	2	1	0	0
	Rheumatism..................	75	83	83	78	83	89	84	76	84	78	75	89	87	87		70	77	88	90	81	76	77	76	67	71	75	76	74	85
	Scarlet fever................	8	17	14	0	0	7	27	36	13	10	18	26	17	30		10	9	13	15	13	9	4	10	8	10	8	7	9	6
	Smallpox....................	0.4	0.3	0	0	0	0	3	0	0	0	0	0	0	0		0.4	0.8	0	0	0	0	6	0	1	0	0	0	0	2
	Tonsillitis..................	45	44	48	48	47	54	41	30	28	39	33	39	53	73		52	53	65	63	65	55	56	56	38	40	42	51	62	60
	Whooping-cough.............	8	6	17	22	17	11	5	3	0	0	0	0	0	0		8	3	4	0	0	4	8	11	6	5	1	0	0	0

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*, †, d. These notes are on the first page of Table 5.

TABLE 5.—CONCLUDED.—*Diseases in the Southeastern Division of the State, for the year and by months in 1900; also an average for the period of 10 years, 1890-99—indicating what per cent of the weekly reports received stated the presence of the diseases named.*d

Division.*	Diseases.	1890-1899.	1900.†	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	Av. for tab. dis. rep. pres	17	17	17	17	18	17	18	15	17	19	19	16	18	17
Southeastern Division.*	Brain, inflammation of	2	1	0	0	2	8	5	0	0	0	0	2	0	0
	Bowels, inflammation of	8	10	6	15	10	11	15	13	13	2	9	11	11	8
	Bronchitis	51	42	43	54	50	67	48	25	15	20	45	45	47	49
	Cerebro-spinal meningitis	1	2	0	4	10	3	8	0	5	0	0	0	0	0
	Cholera infantum	7	10	0	0	0	8	3	3	21	36	30	4	0	0
	Cholera morbus	11	13	4	0	2	0	0	9	26	40	36	21	0	0
	Consumption, pulmonary	33	30	43	30	31	22	45	44	33	33	30	13	16	14
	Croup, membranous	2	2	0	0	0	0	3	0	0	2	2	4	8	11
	Diphtheria	6	5	4	2	0	0	3	9	0	2	14	9	11	3
	Diarrhea	33	44	22	20	14	31	20	38	72	84	82	62	45	30
	Dysentery	10	10	8	2	0	3	5	0	8	27	36	11	5	3
	Erysipelas	11	6	6	11	2	3	10	3	5	9	5	2	5	3
	Fever, intermittent	20	8	4	9	5	11	18	9	3	5	5	11	5	19
	Fever, remittent	11	15	10	4	7	11	20	9	8	20	20	28	18	19
	Fever, typhoid (enteric)	12	22	29	15	7	11	13	6	15	20	36	43	39	27
	Fever, typho-malarial	4	2	0	0	0	0	0	0	0	4	7	2	8	0
	Influenza	40	31	45	48	48	53	25	13	13	15	25	15	32	43
	Kidney, inflammation of	17	18	8	13	12	8	23	16	23	29	20	21	21	24
	Measles	7	15	20	26	36	25	20	25	15	2	0	6	3	5
	Neuralgia	44	48	39	41	50	50	78	50	56	47	30	34	50	54
	Pleuritis	13	13	14	17	24	14	13	13	8	13	9	11	13	14
	Pneumonia	17	21	41	37	55	28	15	6	5	2	9	4	29	27
	Puerperal fever	2	2	2	9	2	0	0	3	3	2	0	0	0	0
	Rheumatism	58	60	57	52	69	53	60	66	69	58	59	51	63	68
	Scarlet fever	9	13	22	15	5	19	13	6	15	16	5	0	21	14
	Smallpox	0.3	3	0	0	2	8	5	13	10	4	0	0	0	0
	Tonsillitis	38	35	45	46	48	39	40	28	23	27	18	30	32	49
	Whooping-cough	5	5	2	0	0	0	0	0	3	16	14	2	13	5

*, †, d. These notes are on the first page of Table 5.

TABLE 6.—*A summary for the year 1900, relative to diseases in each of the 11 divisions of the State,—indicating the prevalence as regards both time and area.*

Diseases.	Upper Peninsular Division.*				Northwestern Division.*				Northern Division.*				Northeastern Division.*				Western Division.*			
	Per cent of observers reporting presence of. b	Av. per cent of weeks reported present, where present. c	Per cent of reports stating presence of. d	Av. order of prevalence where present. e	Per cent of observers reporting presence of. b	Av. per cent of weeks reported present where present. c	Per cent of reports stating presence of. d	Av. order of prevalence where present. e	Per cent of observers reporting presence of. b	Av. per cent of weeks reported present where present. c	Per cent of reports stating presence of. d	Av. order of prevalence where present. e	Per cent of observers reporting presence of. b	Av. per cent of weeks reported present where present. c	Per cent of reports stating presence of. d	Av. order of prevalence where present. e	Per cent of observers reporting presence of. b	Av. per cent of weeks reported present where present. c	Per cent of reports stating presence of. d	Av. order of prevalence where present. e
Av. for tab. dis. reported present.	31	65	21	3.2	24	64	15	2.9	36	69	25	3.2	32	70	23	3.1	26	64	17	2.6
Brain, inflammation of	4	22	1	3.5	3	22	0.7	2.5	7	42	3	4.8	7	42	3	4.0	3	35	1	1.5
Bowels, inflammation of	32	48	15	4.4	12	43	5	4.6	38	41	16	4.3	63	51	34	3.9	17	40	7	3.0
Bronchitis	64	76	50	2.5	53	77	41	3.0	89	89	81	2.6	93	75	70	2.5	65	70	46	2.5
Cerebro-spinal meningitis	9	37	4	3.8	4	55	2	3.7	5	36	2	4.8	9	47	4	3.8	2	50	0.6	3.5
Cholera infantum	39	57	23	3.1	32	65	22	2.6	28	55	16	3.7	16	64	10	3.7	11	64	7	2.2
Cholera morbus	20	41	8	3.6	28	70	20	2.9	31	57	18	3.3	26	60	15	2.1	13	49	7	2.7
Consumption, pulmonary	58	92	54	3.3	27	89	24	2.3	18	75	12	2.5	19	69	13	4.0	31	82	27	3.2
Croup, membranous	2	25	0.5	3.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diphtheria	26	37	8	4.1	4	38	2	4.7	1	67	0.7	1.0	7	38	3	3.0	6	37	3	2.6
Diarrhea	62	70	43	2.3	45	70	32	2.5	62	73	45	2.9	67	75	51	2.8	52	57	29	2.5
Dysentery	40	47	19	3.9	24	52	13	3.5	41	50	21	3.0	35	45	17	3.2	17	41	8	2.5
Erysipelas	14	44	6	4.1	25	44	10	4.2	46	56	25	3.5	33	80	28	4.3	28	46	13	2.9
Fever, intermittent	3	43	2	4.0	9	64	6	3.4	30	60	18	3.0	9	22	2	4.0	23	59	14	2.6
Fever, remittent	7	29	2	3.7	12	54	7	2.9	30	69	22	3.5	23	88	21	2.4	25	64	17	3.5
Fever, typhoid (enteric)	43	78	35	2.4	35	75	28	2.0	15	70	10	2.5	5	50	2	2.5	13	58	8	3.5
Fever, typho-malarial	1	33	0.3	2.0	4	23	1	3.0	0	0	0	0	2	25	0.6	3.0	6	46	3	1.5
Influenza	46	70	32	2.5	28	79	21	2.4	50	80	39	2.2	49	87	45	1.7	66	76	50	1.8
Kidney, inflammation of	39	65	25	3.7	23	46	10	4.4	54	53	29	3.9	63	68	44	3.1	28	44	13	3.5
Measles	27	59	16	2.3	20	42	8	1.3	30	67	20	3.1	14	46	6	2.3	29	63	18	2.3
Neuralgia	54	77	43	3.4	53	72	38	2.7	95	86	82	2.8	93	69	64	2.8	83	71	59	2.2
Pleuritis	23	49	11	4.3	39	44	17	3.8	78	63	50	4.0	44	72	34	4.4	24	53	12	3.7
Pneumonia	49	56	28	3.9	21	48	10	3.4	53	55	29	3.8	47	66	30	4.2	20	53	11	3.8
Puerperal fever	8	41	3	5.0	5	25	1	2.8	7	26	2	3.6	0	0	0	0	4	42	2	2.8
Rheumatism	71	73	53	3.3	59	69	41	2.5	97	88	87	2.5	95	84	81	2.4	81	77	62	2.0
Scarlet fever	32	69	22	3.5	40	62	26	2.0	32	53	18	3.1	0	0	0	0	14	61	9	2.7
Smallpox	11	64	7	3.0	0	0	0	0	1	50	0.7	3.0	0	0	0	0	2	63	1	3.0
Tonsillitis	76	71	55	3.0	48	71	34	2.9	72	84	60	3.4	88	78	69	3.3	63	71	45	2.9
Whooping-cough	13	58	8	3.0	9	43	4	2.7	4	57	3	2 7	2	40	1	1.0	10	51	6	3.3

TABLE 6.—CONCLUDED.

Diseases.	Northern Central Division.*				Bay and Eastern Division.*				Central Division.*				Southwestern Division.*				Southern Central Division.*				Southeastern Division.*			
	Per cent of observers reporting presence of.b	Av. per cent of weeks reported present where present.c	Per cent of reports stating presence of.d	Av. order of prevalence where present.e	Per cent of observers reporting presence of.b	Av. per cent of weeks reported present where present.c	Per cent of reports stating presence of.d	Av. order of prevalence where present.e	Per cent of observers reporting presence of.b	Av. per cent of weeks reported present where present.c	Per cent of reports stating presence of.d	Av. order of prevalence where present.e	Per cent of observers reporting presence of.b	Av. per cent of weeks reported present where present.c	Per cent of reports stating presence of.d	Av. order of prevalence where present.e	Per cent of observers reporting presence of.b	Av. per cent of weeks reported present where present.c	Per cent of reports stating presence of.d	Av. order of prevalence where present.e	Per cent of observers reporting presence of.b	Av. per cent of weeks reported present where present.c	Per cent of reports stating presence of.d	Av. order of prevalence where present.e
Av. for tab. dis. rep. present..	25	65	16	2.5	28	62	17	3.0	26	64	17	2.8	29	70	21	3.2	29	65	19	2.7	28	60	17	2.4
Brain, inflammation of.........	8	31	2	3.4	2	25	0.6	3.8	3	53	2	3.3	4	57	2	4.3	0.8	20	0.2	2.0	5	29	1	2.0
Bowels, Inflammation of........	23	45	11	3.2	29	44	13	4.2	18	49	9	3.8	18	54	10	4.0	22	44	10	3.1	22	45	10	2.3
Bronchitis	55	82	43	2.3	66	74	48	2.5	55	76	41	2.7	64	80	51	3.0	68	75	51	2.7	58	70	42	2.3
Cerebro-spinal meningitis	0	0	0	0	6	32	2	3.4	1	31	0.3	6.0	3	50	2	2.3	3	26	0.8	3.0	5	50	2	3.0
Cholera infantum...............	13	54	6	2.6	27	58	16	3.0	19	47	9	2.9	27	55	16	3.2	18	48	9	3.1	19	48	10	2.7
Cholera morbus..................	27	53	14	2.6	27	55	15	2.8	22	53	12	2.9	34	59	21	3.5	30	58	18	2.7	23	52	13	2.7
Consumption, pulmonary.......	9	68	7	2.5	23	80	18	3.9	43	82	36	2.9	16	74	13	4.2	26	72	19	3.0	36	82	30	2.4
Croup, membranous............	0	0	0	0	2	25	0.6	5.5	1	22	0.3	5.5	1	25	0.3	5.0	04	25	0.1	3.0	5	46	2	2.6
Diphtheria.......................	3	29	0.9	3.0	9	46	4	4.4	9	49	4	3.6	4	33	1	5.5	8	47	4	3.4	12	37	5	1.9
Diarrhea	56	66	35	2.2	56	66	37	2.4	60	65	39	2.4	67	66	45	2.4	62	69	43	2.3	62	69	44	2.1
Dysentery........................	20	38	8	2.6	26	54	14	3.6	29	50	14	3.4	19	56	11	3.5	33	54	19	2.9	25	38	10	2.8
Erysipelas	17	43	8	2.7	22	51	11	4.1	15	54	8	3.8	21	45	10	4.5	17	38	7	4.0	16	35	6	2.7
Fever intermittent..............	56	71	42	2.1	27	53	15	3.2	26	58	16	2.8	56	76	43	3.1	28	52	15	3.0	21	40	8	2.1
Fever, remittent	39	64	24	2.8	17	40	7	3.5	20	49	10	2.9	23	44	11	4.5	17	46	8	3.3	23	61	15	2.3
Fever, typhoid (enteric)........	13	79	10	3.1	26	63	16	2.7	22	67	15	3.0	13	55	7	4.4	23	50	12	2.9	27	78	22	2.3
Fever, typho-malarial..........	9	60	5	3.2	7	52	4	3.6	7	41	3	2.8	8	53	4	4.4	5	42	2	2.9	5	45	2	2.7
Influenza	44	75	33	2.3	58	71	41	2.1	51	68	35	2.3	68	82	57	2.3	63	73	47	2.1	48	61	31	2.0
Kidney, inflammation of.......	23	57	14	3.5	32	56	18	3.8	32	67	22	3.3	40	75	31	3.2	30	56	18	3.5	37	47	18	2.9
Measles	22	74	17	2.0	24	55	13	2.1	18	47	8	2.6	18	57	10	2.7	26	59	16	2.5	25	57	15	2.0
Neuralgia.........................	53	67	36	2.5	65	69	45	2.5	69	77	53	2.3	87	84	73	2.8	84	78	68	2.3	69	68	48	2.2
Pleuritis	23	71	18	3.5	33	53	17	4.3	27	50	13	3.5	18	51	9	3.8	25	47	13	3.4	29	43	13	2.9
Pneumonia.......................	33	46	16	3.0	30	48	14	4.0	25	48	12	3.5	28	45	13	3.9	26	46	12	3.9	34	59	21	2.4
Puerperal fever.................	3	38	1	3.0	3	35	1	2.8	5	32	2	2.8	3	25	0.8	2.7	4	33	2	4.3	5	36	2	2.8
Rheumatism......................	59	80	47	1.8	69	76	53	2.6	68	85	58	2.0	85	95	83	2.3	87	88	77	2.1	79	74	60	2.3
Scarlet fever	16	51	9	2.4	15	56	9	3.3	20	45	9	3.0	28	59	17	4.0	18	48	9	2.9	22	56	13	2.3
Smallpox..........................	0	0	0	0	0.6	20	0.1	4.0	1	67	0.9	1.8	1	20	0.3	2.0	2	44	0.8	3.3	5	62	3	2.3
Tonsillitis........................	55	75	42	2.6	68	64	44	2.9	57	67	38	2.8	61	70	44	3.6	74	70	53	2.8	59	58	35	2.4
Whooping-cough...............	11	43	5	1.9	5	59	3	3.1	10	54	6	1.9	8	71	6	2.6	4	70	3	3.7	10	46	5	1.8

* Counties in each division are shown on maps of the State, on pages 201 and 217 of the report of this Board for 1886.

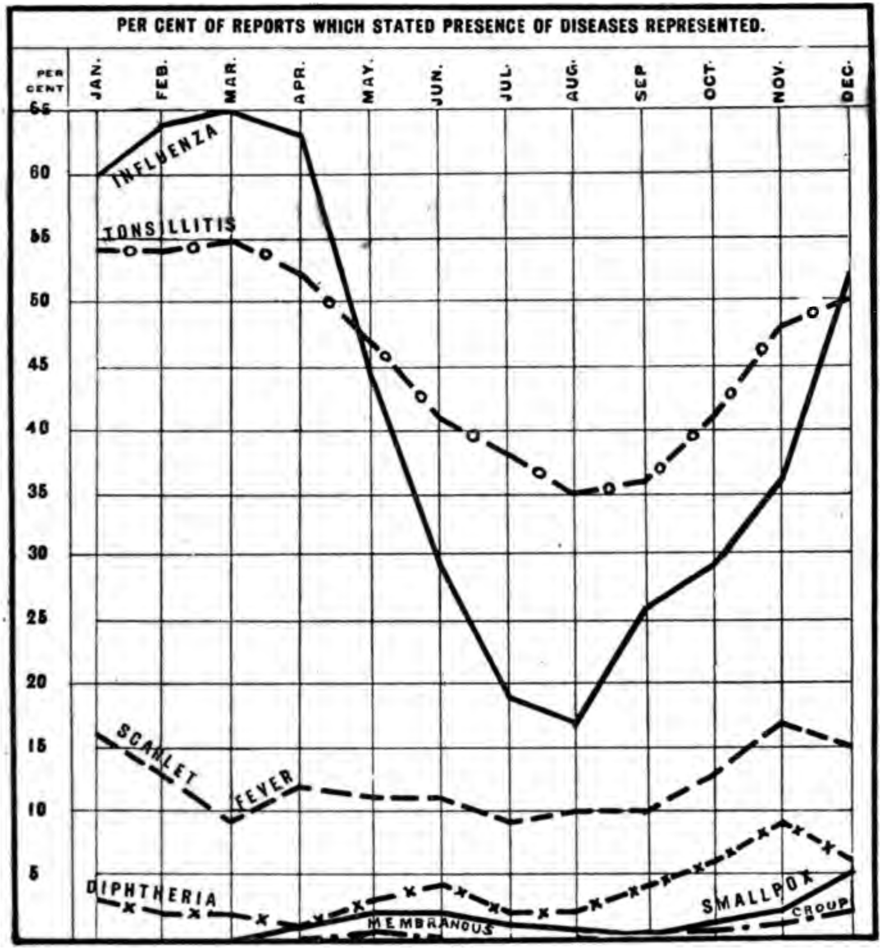
b, c, d, e. Foot-notes with these marks are below the first part of Table 5.

DISEASES IN MICHIGAN, ARRANGED IN ORDER OF PREVALENCE, THOSE WHICH CAUSED MOST SICKNESS FIRST.

TABLE 7.—*Order of prevalence of 28 diseases in Michigan, in the period of 11 years, 1890-1900, and in each of those years, judging from the "per cent of reports," which stated the presence of each of the diseases, in connection with the reported "order of prevalence" when and where each disease was present. (The method of rating diseases for this table is described and illustrated in a "compiling table" on pages 122 and 123 of the annual report for 1890.)*

Order, 1890-1900.	Diseases arranged in order of greatest prevalence.	1900.	1899.	1898.	1897.	1896.	1895.	1894.	1893.	1892.	1891.	1890.
1	Rhuematism	1	1	1	1	1	3	1	1	2	2	1
2	Neuralgia	2	3	3	3	2	1	2	2	1	3	2
3	Influenza	3	2	2	2	3	2	4	3	4	1	4
4	Bronchitis	4	4	4	4	4	4	3	4	3	4	3
5	Diarrhea	5	6	5	6	6	5	5	6	5	5	5
6	Tonsillitis	6	5	6	5	5	6	6	5	6	6	7
7	Intermittent fever	11	9	8	10	8	7	8	7	7	8	8
8	Consumption, pulmonary	9	7	10	11	7	10	7	8	9	7	6
(9)	(The average disease)	10	8	9	10	7	8	9	10	9	10	9
9	Whooping-cough		10	9	8	11	8	10	11	10	10	13
10	Measles		8	11	7	14	18	11	10	16	11	11
11	Remittent fever	1	19	12	20	9	9	9	9	8	9	9
12	Cholera morbus	12	12	23	14	12	11	12	13	14	12	12
13	Pneumonia	20	16	18	18	10	16	16	12	11	13	10
14	Dysentery	16	11	15	16	13	13	13	17	17	17	14
15	Cholera infantum	13	17	14	13	17	12	15	15	15	15	17
16	Inflammation of kidney	18	14	17	21	16	14	17	16	12	14	15
17	Typhoid fever (enteric)	10	13	16	25	19	17	18	14	20	16	20
18	Scarlet fever	14	18	13	19	18	19	14	19	13	22	22
19	Typho-malarial fever	19	15	24	12	21	20	23	22	22	20	19
20	Pleuritis	21	20	19	26	15	21	22	20	19	18	18
21	Erysipelas	26	23	20	22	20	23	21	21	21	19	15
22	Diphtheria	25	24	22	15	24	27	19	18	18	23	23
23	Smallpox	15	28	7	9	28	15	26	28	28	28	28
24	Inflammation of bowels	24	21	21	23	22	22	20	23	23	21	21
25	Puerperal fever	23	25	25	24	23	24	24	24	26	25	24
26	Membranous croup	28	27	28	17	26	28	27	25	27	24	25
27	Cerebro-spinal meningitis	27	22	26	28	25	25	25	27	24	27	26
28	Inflammation of brain	22	26	27	27	27	26	28	26	25	26	27

DIAGRAM 2—WEEKLY REPORTS OF SICKNESS IN MICHIGAN, IN 1900.



[PLATE 1097]

Diseases which cause most sickness in Michigan.—This is shown in this report in Table 7, and more specifically in Table 9, in this report, and in similar tables or "exhibits" in previous reports. The question is differently answered in different years. For many years after the compilation of weekly reports was begun, intermittent fever appeared to be the leading cause of sickness in Michigan.

By Table 7, one may see that in the year 1890 rheumatism, in 1891 influenza, in 1892 neuralgia, in 1893-94 rheumatism, in 1895 neuralgia, and in 1896-1900 rheumatism appeared to have caused most sickness in Michigan. This does not necessarily imply that there was an increase in rheumatism or neuralgia, because one disease *may* exhibit a higher relative order of prevalence on account of some other disease or diseases having been actually lessened in prevalence.

The "average disease" of those reported, is included in Table 7, as a standard by which to judge the fluctuations. It may be seen that in 1891, the "average disease" was lower (10) by one-tenth, than the average (9) of a series of years; in 1892 it was raised to the average; in 1893 it was one-tenth lower than the average; in 1894 it was raised to the average; in 1895 it was one-tenth higher, and in 1896 it was two-tenths higher than the average; in 1897 it was one-tenth lower than the average; in 1898 it was raised to the average; in 1899 it was one-tenth higher than the average, and in 1900 it was one-tenth lower than the average.

In this connection it should be stated that the average number of diseases reported on each card gradually decreased during the years 1890-99. This is shown in Table 8, as follows:—

TABLE 8.—*Stating for each of the 11 years, 1890-1900, the number of card reports received, the total number of disease reports and the average number of diseases reported on each card; also the average for the 10 years, 1890-99.*

Year.	Number of card reports received.	Number of disease reports.	Av. number of diseases on each card.
1890	4,939	33,934	6.87
1891	4,291	28,741	6.70
1892	5,281	31,269	5.92
1893	5,853	32,723	5.59
1894	5,572	30,619	5.50
1895	4,394	24,004	5.46
1896	3,940	19,443	4.93
1897	4,418	21,828	4.94
1898	5,219	24,946	4.78
1899	5,126	24,700	4.82
Average for the 10 years, 1890-99	4,903	27,221	5.55
1900	5,513	28,463	5.34

TABLE 9.—*Diseases from which there seems to have been the most sickness in Michigan in 1900, as indicated by the per cent of weekly reports stating presence of the diseases, as studied in connection with the average order of prevalence of said diseases when reported present; also order, per cent of reports and average order for the same diseases in 1899, 1898, 1897, and 1896.*

	1900.				1899.			1898.			1897.			1896.		
	Order.*	Diseases in order of apparent amount of sickness in 1900. Most prevalent disease first.	Per cent of reports stating presence of. d	Av. order of prevalence when present. e	Order.*	Per cent of reports stating presence of. d	Av. order of prevalence when present. e	Order.*	Per cent of reports stating presence of. d	Av. order of prevalence when present. e	Order.*	Per cent of reports stating presence of. d	Av. order of prevalence when present. e	Order.*	Per cent of reports stating presence of. d	Av. order of prevalence when present. e
More sickness than av. for 28 diseases.	1	Rheumatism	63	2.3	1	63	2.3	1	62	2.2	1	66	2.3	1	60	2.3
	2	Neuralgia	56	2.5	3	56	2.4	3	54	2.3	3	58	2.4	2	54	2.3
	3	Influenza	40	2.1	2	42	1.7	2	45	1.7	2	47	1.8	3	44	1:8
	4	Bronchitis	49	2.6	4	50	2.5	4	49	2.5	4	50	2.6	4	51	2.4
	5	Diarrhea	40	2.4	6	37	2.5	5	36	2.4	6	34	2.5	6	34	2.5
	6	Tonsillitis	45	2.9	5	42	2.7	6	40	2.7	5	43	2.6	5	45	2.6
	7	Whooping-cough	5	2.5	10	4	2.3	9	5	2.4	8	4	2.1	11	7	2.4
	8	Measles	13	2.4	8	6	2.3	11	7	2.7	7	13	2.3	14	7	2.7
	9	Consumption, pulmonary	25	3.0	7	22	2.9	10	20	2.9	11	20	3.1	7	23	3.0
Less than said average.	(10)	Average	18	2.8	(8)	17	2.8	(9)	17	2.6	(10)	18	2.7	(9)	18	2.7
	10	Typhoid fever (enteric)	15	2.8	13	9	2.9	16	8	2.9	25	7	3.3	19	10	3.3
	11	Intermittent fever	16	2.9	9	17	2.9	8	19	2.6	10	17	2.7	8	19	2.7
	12	Cholera morbus	14	2.9	12	10	2.9	23	12	2.7	14	10	3.0	12	11	2.9
	13	Cholera infantum	12	3.0	17	8	3.1	14	8	2.8	13	8	2.9	17	8	2.9
	14	Scarlet fever	12	3.0	18	8	3.1	13	5	2.7	19	4	3.0	18	8	3.1
	15	Smallpox	1	2.7	28	0.4	4.7	7	.04	2.0	9	.05	2.0	28	4	6.3

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* Judging from the per cent of reports which stated presence of the disease in connection with the order of prevalence when present. The method of rating diseases, as causes of sickness is fully described and illustrated by a "compiling table" on pages 122 and 123 of the annual report for the year 1890.

d This column states what per cent the number of reports stating presence of a disease is of the whole number of reports received, for the time specified, from *all observers* in the State. It combines and states in a general way an idea of the *time* a disease was prevalent, with an idea of the area of prevalence.

e The disease having the greatest number of cases was to be marked 1, in the order; the disease having the next greatest number of cases, 2; and so on. Diseases not present were to be marked 0. The numbers in this column are found by dividing the totals of the order of prevalence columns in Table 3 omitted from this report because of lack of room) by the number of observers who reported the disease present. The column is, therefore, an average, not for all the localities represented, but only for those at which the given disease was reported present. The numbers in the "average" lines for this column are found by dividing the sum of the totals in the order of prevalence columns, in Table 3, for all diseases reported present, by the sum of the numbers of observers, who reported the different diseases present, thus counting each observer once for every disease he reported present. As a rule, small numbers in this column indicate the large prevalence of the disease, and *vice versa;* but the greater the number of diseases reported present, by each observer, from week to week, the greater will be the average in this column.

TABLE 10.—*In each of 11 geographical divisions of the State the 15 diseases from which there seems to have been the greatest amount of sickness in 1900, as indicated by the per cent of weekly reports stating presence of each of 28 leading diseases, when studied in connection with the average order of prevalence of said diseases when reported present.*

	Order.*	Diseases in order of apparent amount of sickness. Most prevalent disease first.	Per cent of reports stating presence of.d	Av. order of prevalence when pres.e	Diseases in order of apparent amount of sickness. Most prevalent disease first.	Per cent of reports stating presence of.d	Av. order of prevalence when pres.e	Diseases in order of apparent amount of sickness. Most prevalent disease first.	Per cent of reports stating presence of.d	Av. order of prevalence when pres.e
		UPPER PENINSULAR DIVISION.†			NORTHWESTERN DIVISION.†			NORTHERN DIVISION.†		
More sickness than av. for 28 diseases.	1	Bronchitis	50	2.5	Rheumatism	41	2.5	Rheumatism	87	2.5
	2	Diarrhea	43	2.3	Neuralgia	38	2.7	Bronchitis	81	2.6
	3	Tonsillitis	55	3.0	Bronchitis	41	3.0	Neuralgia	82	2.8
	4	Consumption, pul.	54	3 3	Typhoid fev. (ent.)	28	2.0	Influenza	39	2.2
	5	Rheumatism	53	3.3	Diarrhea	32	2.5	Tonsillitis	60	3.4
	6	Typhoid fever (ent)	35	2.4	Scarlet fever	26	2.0	Diarrhea	45	2.9
	7	Influenza	32	2.5	Tonsillitis	34	2.9	Diphtheria	0.7	1.0
	8	Neuralgia	43	3.4	Consumption, pul.	24	2.3	Pleuritis	50	4.0
	9	Measles	16	2.3	Influenza	21	2.4	Consumption, pul.	12	2.5
	10	Cholera infantum	23	3.1	Measles	8	1.3	Typhoid fev. (ent.)	10	2.5
	11	Typho-mal. fever	0.3	2.0	Cholera infantum	22	2.6	Dysentery	21	3 0
	(12)	Average	21	3.2	....	....	....	Average	25	3.2
Less than said average.	12	Scarlet fever	22	3.5	Cholera Morbus	20	2.9	Intermittent fever	18	3.0
	(13)	....	....	....	Average	15	2.9	....	....	....
	13	Inflam. of kidney	25	3.7	Remittent fever	7	2.9	Measles	20	3.1
	14	Pneumonia	28	3.9	Whooping-cough	4	2.7	Scarlet fever	18	3 1
	15	Whooping-cough	8	3.0	Pleuritis	17	3.8	Erysipelas	25	3.5
		NORTHERN CENTRAL DIVISION.†			WESTERN DIVISION.†			NORTHEASTERN DIVISION.†		
More sickness than av. for 28 diseases.	1	Rheumatism	47	1.8	Rheumatism	62	2.0	Rheumatism	81	2.4
	2	Intermittent fever	42	2.1	Influenza	50	1.8	Bronchitis	70	2.5
	3	Bronchitis	43	2.3	Neuralgia	59	2.2	Influenza	45	1.7
	4	Diarrhea	35	2.2	Bronchitis	46	2.5	Neuralgia	64	2.8
	5	Tonsillitis	42	2.6	Tonsillitis	45	2.9	Tonsillitis	69	3.3
	6	Influenza	33	2.3	Typho-mal. fever	3	1.5	Diarrhea	51	2.8
	7	Neuralgia	36	2.5	Diarrhea	29	2.5	Whooping-cough	1	1.0
	8	Measles	17	2.0	Inflam. of brain	1	1.5	Inflam. of kidney	44	3.1
	9	Whooping-cough	5	1.9	Measles	18	2.3	Cholera morbus	15	2.1
	(10)	Average	16	2.5	....	....	....	....	....	....
Less than said average.	10	Remittent fever	24	2.8	Cholera infantum	7	2.2	Remittent fever	21	2.4
	(11)	....	....	....	Average	17	2.6	....	....	....
	11	Scarlet fever	9	2.4	Intermittent fever	14	2.6	Measles	6	2.3
	(12)	....	....	....	....	....	....	Average	23	3.1
	12	Cholera morbus	14	2.6	Consumption, pul.	27	3.2	Typhoid fev. (ent.)	2	2.5
	13	Consumption, pul.	7	2.5	Dysentery	8	2.5	Inflam. of bowels	34	3.9
	14	Dysentery	8	2.6	Scarlet fever	9	2.7	Dysentery	17	3.2
	15	Cholera infantum	6	2.6	Erysipelas	13	2.9	Diphtheria	3	3.0

TABLE 10.—CONCLUDED.

	Order.*	Diseases in order of apparent amount of sickness. Most prevalent disease first.	Per cent of reports stating presence of.[d]	Av. order of prevalence when pres.[e]	Diseases in order of apparent amount of sickness. Most prevalent disease first.	Per cent of reports stating presence of.[d]	Av. order of prevalence when pres.[e]	Diseases in order of apparent amount of sickness. Most prevalent disease first.	Per cent of reports stating presence of.[d]	Av. order of prevalence when pres.[e]
		BAY AND EASTERN DIVISION.†			CENTRAL DIVISION.†			SOUTHWESTERN DIVISION.†		
More sickness than av. for 28 diseases.	1	Rheumatism	53	2.6	Rheumatism	58	2.0	Rheumatism	83	2.3
	2	Bronchitis	48	2.5	Neuralgia	53	2.3	Neuralgia	73	2.8
	3	Influenza	41	2.1	Diarrhea	39	2.4	Influenza	57	2.3
	4	Diarrhea	37	2.4	Bronchitis	41	2.7	Diarrhea	45	2.4
	5	Tonsillitis	44	2.9	Influenza	35	2.3	Bronchitis	51	3.0
	6	Measles	13	2.1	Tonsillitis	38	2.8	Intermittent fever	43	3.1
	7	Typhoid fev. (ent.)	16	2.7	Consumption, pul.	36	2.9	Tonsillitis	44	3.6
	8	Cholera morbus	15	2.8	Whooping-cough	6	1.9	Inflam. of kidney	31	3.2
	(9)	Average	17	3.0	Average	17	2.8	....	....	....
Less.	9	Cholera infantum	16	3.0	Intermittent fever	16	2.8	Smallpox	0.3	2.0
	10	Intermittent fever	15	3.2	Inflam. of kidney	22	3.3	Cerebro-spi. men	2	2.3
	11	Inflam. of kidney	18	3.8	Smallpox	0.9	1.8	Measles	10	2.7
	(12)	....	....	....	....	....	....	Average	21	3.2
	12	Dysentery	14	3.6	Typhoid fev. (ent.)	15	3.0	Whooping-cough	6	2.6
	13	Scarlet fever	9	3.3	Measles	8	2.6	Cholera infantum	16	3.2
	14	Puerperal fever	1	2.8	Cholera morbus	12	2.9	Cholera morbus	21	3.5
	15	Consumption, pul.	18	3.9	Remittent fever	10	2.9	Puerperal fever	0.8	2.7
		SOUTHERN CENTRAL DIVISION.†			SOUTHEASTERN DIVISION.†					
More sickness than av. for 28 diseases.	1	Rheumatism	77	2.1	Rheumatism				60	2.3
	2	Neuralgia	68	2.3	Diarrhea				44	2.1
	3	Influenza	47	2.1	Neuralgia				48	2.2
	4	Diarrhea	43	2.3	Influenza				31	2.0
	5	Bronchitis	51	2.7	Bronchitis				42	2.3
	6	Tonsillitis	53	2.8	Tonsillitis				35	2.4
	7	Inflam. of brain	0.2	2.0	Measles				15	2.0
	8	Measles	16	2.5	Whooping-cough				5	1.8
	(9)	Average	19	2.7	....				....	....
Less.	9	Cholera morbus	18	2.7	Consumption, pulmonary				30	2.4
	10	Dysentery	19	2.9	Diphtheria				5	1.9
	11	Consumption, pul.	19	3.0	Typhoid fever (enteric)				22	2 3
	12	Typhoid fev. (ent.)	12	2.9	Intermittent fever				8	2.1
	13	Intermittent fever	15	3.0	Pneumonia				21	2.4
	14	Scarlet fever	9	2.9	Inflammation of brain				1	2.0
	15	Inflam. of bowels	10	3.1	Remittent fever				15	2.3
	(17)	....	....	....	Average				17	2.4

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*, d, e. Foot-notes with these marks are under Table 9.

† The counties in each division are shown on maps of the State, on pages 201 and 217 of the report of this Board for 1886.

TABLE 11.—*Showing comparisons between the averages of certain meteorological conditions at the stations in Michigan in 1900, with those in preceding years. (Abstracted from the article on Principal Meteorological Conditions in Michigan, on preceding pages of this report.)*

Meteorological conditions.		Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Average temperature.......	In 1900 higher than av. for 10 years, 1890-99.....	1.22	3.60	......	......	0.91	2.47	......	0.39	5.76	3.61	8.26	......	0.53
	Lower....................................	......	......	4.14	5.41	......	......	1.31	......	......	......	......	0.02	......
Av. daily range of temp......	In 1900 greater than av. for 10 years, 1890-99....	0.36	0.01	2.16	1.46	0.20	1.42	0.11	......	......	......	2.88	......	......
	Less....................................	......	......	......	......	......	......	......	1.39	0.61	0.20	......	0.87	0.90
Absolute humidity............	In 1900 more than av. for 10 years, 1890-99.......	0.13	0.10	......	......	......	0.09	......	0.22	1.22	0.37	0.96	0.03	......
	Less....................................	......	......	0.27	0.46	0.08	......	0.42	......	......	......	......	......	0.15
Relative humidity............	In 1900 more than av. for 10 years, 1890-99.......	2	......	=	1	=	......	3	6	5	1	3	3	......
	Less....................................	......	2	=	......	=	1	......	......	......	......	......	......	3
Cloudiness....................	In 1900 greater than av. for 10 years, 1890-99....	......	6	......	......	......	1	......	6	1	1	......	......	......
	Less....................................	2	......	3	2	9	......	8	......	......	......	9	3	1
Rainfall.......................	In 1900 more than av. for 10 years, 1890-99.......	......	......	1.00	......	......	......	......	1.73	0.54	......	......	0.42	......
	Less....................................	1.80	1.07	......	0.31	0.82	0.66	0.65	......	......	0.09	0.30	......	1.59
Day ozone.....................	In 1900 more than av. for 10 years, 1890-99.......	......	......	......	0.10	......	......	0.18	......	......	......	......	......	......
	Less....................................	0.33	0.45	0.45	......	0.35	0.10	......	0.01	0.07	0.81	0.76	0.43	0.76
Night ozone..................	In 1900 more than av. for 10 years, 1890-99.......	......	......	......	0.04	......	0.24	0.54	......	......	......	......	......	......
	Less....................................	0.38	0.52	0.40	......	0.17	......	......	0.13	0.51	0.44	1.38	0.74	0.96
Velocity of wind..............	In 1900 greater than av. for 10 years, 1890-99....	=	0.9	0.6	0.3	......	......	0.6	1.6	......	0.2	......	=	0.3
	Less....................................	=	......	......	......	1.6	0.6	......	......	0.4	......	1.4	=	......
Atmospheric pressure........	In 1900 greater than av. for 10 years, 1890-99....	.057	.018	......	.073	.083	.065	.048	.024	.081	.054	.146	.039	.060
	Less....................................	......	......	.003	......	......	......	......	......	......	......	......	......	......

CLIMATE AND SICKNESS.*

Table 12 (and similar tables or "exhibits" in previous reports) is an attempt to learn something of the relations of bronchitis to meteorological conditions, by noting whether each meteorological condition was above or below its average for the year, in months when more or in months when less bronchitis than the average for the year was reported. The months are arranged in order according to the prevalence of bronchitis; those months in which most bronchitis was reported being placed first in the column; those in which more bronchitis that the average was reported are placed above the average line; the others below that line. The meteorological conditions for each month are printed, in the proper columns, in the line for the month. The statements being thus arranged, it is easy to see whether the temperature, the velocity of the wind, or any other condition represented, was above its annual average in months when more than the average amount of bronchitis was reported, or *vice versa.*

That the comparisons may the more readily be held in mind, propositions have been made concerning the relations of bronchitis to meteorological conditions, grouping the conditions into two classes. The letters *a* and *b* in the table mark exceptions to these propositions. It is not supposed that the propositions are in every case true concerning the disease; but the propositions serve to bring out the evidence of the table on the subject in question. This evidence is appreciated by noting the number and force of the exceptions to the propositions, and also whether the exception is explained by facts shown in other columns. A summary of the evidence is presented in Table 15, near the close of this article.

Propositions similar to those relative to bronchitis, but relating to other diseases, are given on following pages. The propositions are differently stated for the summer diseases and for the winter diseases, but they are not changed to fit the individual diseases under each class.

*Relations of bronchitis and other "cold-weather" diseases to meteorological conditions.**

PROPOSITION 1.—That in months when **more** than the average per cent of weekly reports stated the presence of bronchitis, pneumonia, membranous croup, diphtheria, tonsillitis, influenza, scarlet fever, rheumatism, neuralgia, pleuritis, pulmonary consumption, cerebrospinal meningitis, erysipelas, inflammation of kidney, puerperal fever, smallpox, or average disease, the relative humidity of the atmosphere, the average per cent of cloudiness, the ozone, the average velocity of the wind, the monthly and the average daily range of the barometer, were **greater** than the average for the year; and in months when **less** than the average per cent of reports stated the presence of bronchitis (or of the other diseases named), these conditions were **less** than the average for the year. In Table 12, the letter *a* marks exceptions to this proposition relating to bronchitis for the year 1900.

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* A comparison of meteorological conditions in 1900, with the averages for series of years, is given on a preceding page of this article.

Proposition 2.—That in months when **more** than the average per cent of weekly reports stated the presence of bronchitis, pneumonia, membranous croup, diphtheria, tonsillitis, influenza, scarlet fever, rheumatism, neuralgia, pleuritis, pulmonary consumption, cerebrospinal meningitis, erysipelas, inflammation of kidney, puerperal fever, smallpox, or average disease, the average daily temperature, the average daily range of temperature, the absolute humidity of the atmosphere and the average daily pressure of the atmosphere were **less** than the average for the year; and in months when **less** than the average per cent of reports stated the presence of bronchitis (or of the other diseases named), these conditions were **greater** than the average for the year. In Table 12, the letter *b* marks exceptions to this proposition relating to bronchitis for months in 1900.

Proposition 3.—For those months which are not, as regards the absolute humidity of the atmosphere, exceptions to proposition 2, it is true also that the quantity of vapor inhaled daily was **less** than the average, and the quantity exhaled daily in excess of that inhaled was **greater** than the average in months where **more** than the average per cent of reports stated presence of bronchitis, or of the other diseases named in propositions 1 and 2; and that **more** vapor was inhaled and a **less** excess exhaled daily in months when the per cent of reports stating presence of bronchitis, or of the other diseases named in propositions 1 and 2, was **less** than the average.

What per cent of the weekly reports received stated presence of the diseases mentioned in the preceding propositions by months in the years 1890-1900, is stated in Tables 13 and 17, on subsequent pages of this article.

For the preparation of Tables 15 and 16 in this article, tables similar to Table 12 relating to bronchitis have been prepared for the other twenty-seven diseases which are considered in this article, and also for the average disease, but, on account of lack of space, are not printed.

TABLE 12.—BRONCHITIS.—*Stating for the year and for each month of the year 1900, what per cent of the weekly reports of sickness stated presence of bronchitis and what were the meteorological conditions as observed at stations in Michigan.**

BRONCHITIS.				Temperature, F.		Humidity of air.§ Av. of 3 daily observations.		Vapor inhaled and exhaled from the air passages by one person in 24 hours, troy ounces.			Ozone, relative. Scale of 10°.			Atmospheric pressure, inches. Reduced to 32° F.		
														Range.		
	Months in order of greatest per cent of weekly reports stating presence of.	Per cent of weekly reports stating presence of.	Av. order of prevalence where present.†‡	Av. daily range by registering thermometers.	Average of three daily observations.	Relative per cent of saturation.	Absolute — grains of vapor in a cubic foot of air.	Inhaled.‖	Exhaled in excess of that inhaled.¶	Average per cent of cloudiness.	Day observation, 7 A. M. to 2 P. M.	Night observation, 9 P. M. to 7 A. M.	Av. velocity of wind, miles per hour by anemometer.	Monthly and for year.	Av. daily by 3 daily observations.**	Average pressure.
More than av. per cent of bronchitis.	March..	65	2.4	17.97	25.11	81	1.42	.89	10.79	55	4.32	4.66	11.5	1.183	.291	*b* 29.169
	Feb.....	64	2.3	17.62	19.38	83	1.27	.79	10.89	64	3.72	4.22	11.6	1.165	.280	29.080
	April...	63	2.5	*b*19.12	46.95	*a* 73	2.93	1.83	9.85	*a* 43	3.48	4.23	*a* 9.0	*a* .778	*a* .186	*b* 29.190
	Jan.....	57	2.3	14.43	26.83	82	1.63	1.02	10.66	78	3.63	*a* 3.52	11.6	.973	.261	29.106
	Dec.....	57	2.3	12.15	28.37	80	1.61	1.01	10.67	71	*a* 2.88	*a* 3.18	11.4	1.017	.205	29.150
	May....	53	2.4	*b*21.31	*b*58.95	*a* 72	*b* 4.23	2.64	9.04	53	4.05	4.78	*a* 9.1	*a* .536	*a* .137	29.119
	Nov....	51	2.5	13.01	36.36	84	2.39	1.49	10.19	68	*a* 2.84	*a* 2.88	10.9	1.075	.216	29.147
Av.......		49	2.6	18.17	48.19	79	3.67	2.29	9.39	53	3.40	3.69	9.8	.813	.190	29.154
Less than av. per cent of bronchitis.	Oct.....	43	2.6	20.32	57.73	*a* 80	4.77	2.98	8.70	45	2.54	2.13	8.3	.587	.148	29.253
	June....	41	2.4	21.36	66.93	76	5.41	3.38	8.30	35	*a* 3.92	*a* 4.73	8.5	.619	.169	*b* 29.127
	Sept....	37	3.5	20.30	65.70	77	5.38	3.36	8.32	43	2.41	2.88	9.1	.768	.173	29.202
	July....	36	2.1	20.07	71.53	77	6.28	3.93	7.75	44	3.16	3.45	9.4	.598	.130	*b* 29.123
	Aug....	32	3.3	20.39	74.40	78	7.02	4.39	7.29	41	*a* 3.87	3.64	7.1	.456	.082	29.181

* Statements relative to meteorological conditions may be found in an article on the principal meteorological conditions in Michigan in 1900, on preceding pages of this report.

† Explanations of statements in this and the preceding columns, and other statements relative to the prevalence in 1900, of the diseases under consideration may be found in Tables 5 and 6 of this article, and also in Diagrams 1, 2, 3, 4 and 5. When the per cent of reports stated for any disease is the same for two months or for any month is the same as the average, the order of months in the first column of these exhibits has been determined by reference to fractional per cents.

‡ Small numbers in this column indicate great prevalence in the localities where the disease occurred, as compared with other diseases; and large numbers a less prevalence.

§ Calculated from readings of dry bulb and wet bulb thermometers.

‖ Calculated for 18 respirations per minute, of 20 cubic inches of air each.

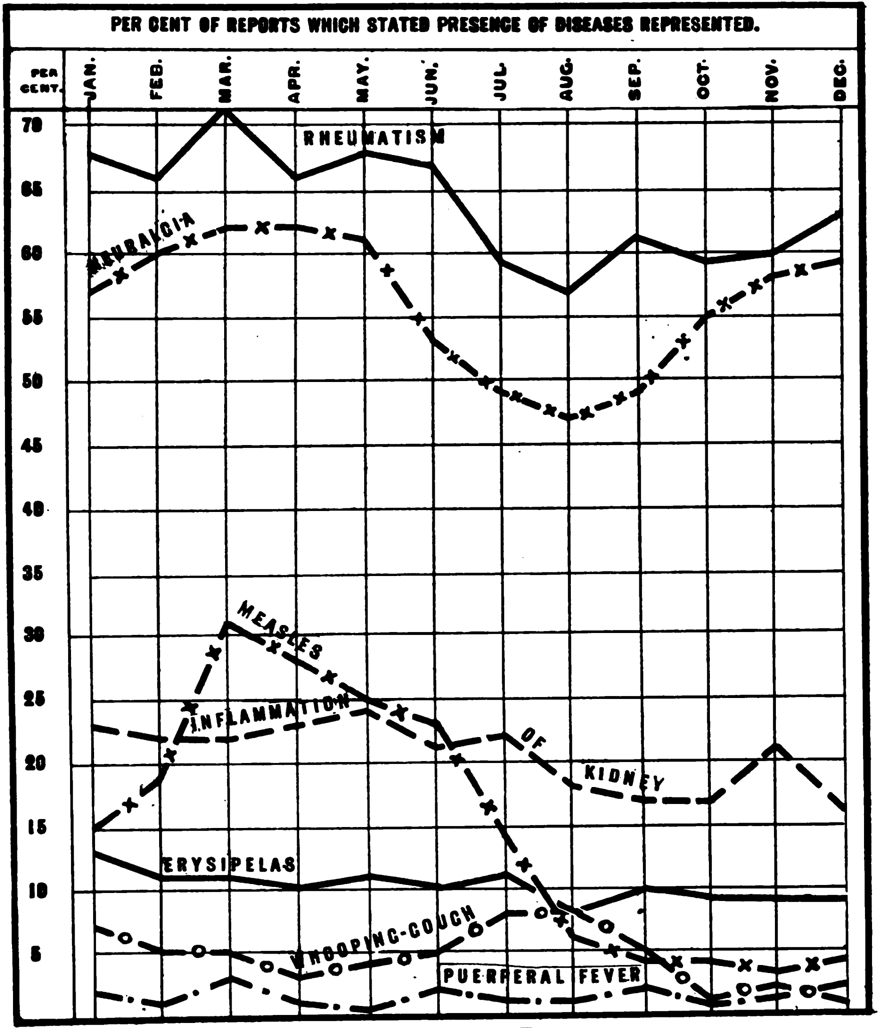
¶ Assuming the air exhaled to be saturated with vapor at the temperature of 98° F., in which case each cubic foot of air contains 18.69 grains of vapor, and 18 respirations per minute, of 20 cubic inches of air each, make 11.68 troy ounces of vapor exhaled daily. No correction has been made for the expansion of air after it is inhaled.

** The daily range from which numbers in this column were computed is the difference between the highest and the lowest of the four observations taken during the 24 hours, namely, at 7 a. m., 2 p. m., 9 p. m. of one day, and 7 a. m. of the following day.

a An exception to the proposition that more than the average per cent of weekly reports stated presence of bronchitis in months when the meteorological condition named at the head of the column was greater than the average for the year; and less in months when the same condition was less than the average. Proposition 1, relating to bronchitis and other "cold-weather" diseases, is on a preceding page in this article.

b An exception to the proposition that more than the average per cent of weekly reports stated presence of bronchitis in months when the meteorological condition named at the head of the column was less than the average for the year, and less in months when the same condition was greater than the average for the year. Proposition 2, relating to bronchitis and other "cold-weather" diseases, is on a preceding page in this article.

DIAGRAM 3—WEEKLY REPORTS OF SICKNESS IN MICHIGAN, IN 1900.



[PLATE 1098]

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*Relations of diarrhea and other "warm-weather" diseases to meteorological conditions.**

PROPOSITION 1.—That in months when **more** than the average per cent of weekly reports stated the presence of diarrhea, cholera infantum, intermittent fever, remittent fever, typhoid fever, typho-malarial fever, cholera morbus, dysentery, measles, whooping-cough, inflammation of brain, or inflammation of bowels, the average daily temperature, the average daily range of temperature, the absolute humidity of the atmosphere, and the average daily pressure of the atmosphere were **greater** than the average for the year; and in months when **less** than the average per cent of reports stated the presence of diarrhea (or of the other diseases named), these conditions were **less** than the average for the year.

PROPOSITION 2.—That in months when **more** than the average per cent of weekly reports stated the presence of diarrhea, cholera infantum, intermittent fever, remittent fever, typhoid fever, typho-malarial fever, cholera morbus, dysentery, measles, whooping-cough, inflammation of brain, or inflammation of bowels, the relative humidity of the atmosphere, the average per cent of cloudiness, the ozone, the average velocity of the wind, and the monthly and average daily range of the barometer were **less** than the average for the year; and that in months when **less** than the average per cent of reports stated the presence of diarrhea (or of the other diseases named), these conditions were **greater** than the average for the year.

Explanations of propositions 1 and 2 are given on a preceding page, under the heading, "Climate and Sickness."

A summary relative to the foregoing propositions, is presented in Table 16, near the close of this article.

PROPOSITION 3.—For those months which are not, as regards the absolute humidity of the atmosphere, exceptions to proposition 1, it is true, also, that the quantity of vapor inhaled daily was **greater** than the average, and the quantity exhaled daily in excess of that inhaled was **less** than the average in months when **more** than the average per cent of reports stated presence of diarrhea, or of the other diseases named in propositions 1 and 2; and that **less** vapor was inhaled and a **greater** excess exhaled daily in months when the per cent of reports stating presence of diarrhea or of the other diseases named in propositions 1 and 2 was **less** than the average.

On what per cent of the weekly reports received, by months in the years 1890-1900, the twelve foregoing diseases were reported present, is stated in Table 14, on a subsequent page of this article.

The lines for 1900, relative to the twelve diseases, are graphically represented in Diagrams 1, 3, 4 and 5 in this article.

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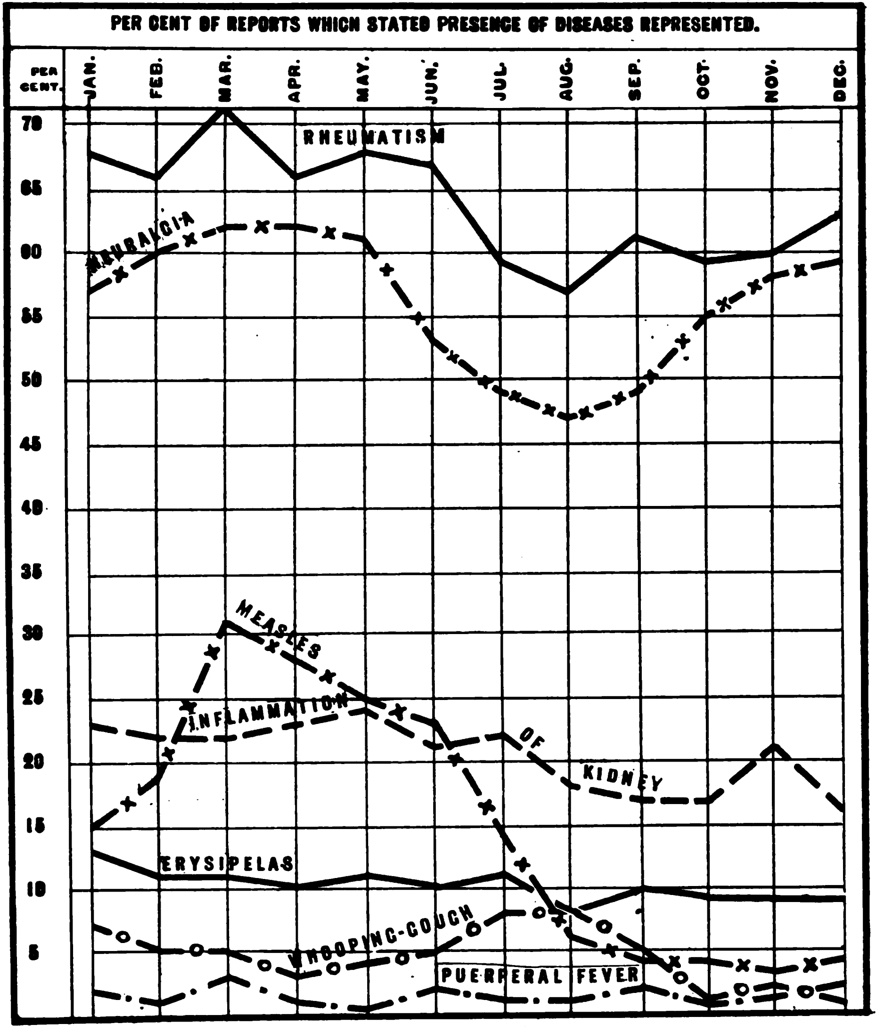
* A comparison of meteorological conditions in 1900, with the average for series of years, is given on a preceding page of this article.

DIAGRAM 3—WEEKLY REPORTS OF SICKNESS IN MICHIGAN, IN 1900.



[PLATE 1098]

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*Relations of diarrhea and other "warm-weather" diseases to meteorological conditions.**

PROPOSITION 1.—That in months when **more** than the average per cent of weekly reports stated the presence of diarrhea, cholera infantum, intermittent fever, remittent fever, typhoid fever, typho-malarial fever, cholera morbus, dysentery, measles, whooping-cough, inflammation of brain, or inflammation of bowels, the average daily temperature, the average daily range of temperature, the absolute humidity of the atmosphere, and the average daily pressure of the atmosphere were **greater** than the average for the year; and in months when **less** than the average per cent of reports stated the presence of diarrhea (or of the other diseases named), these conditions were **less** than the average for the year.

PROPOSITION 2.—That in months when **more** than the average per cent of weekly reports stated the presence of diarrhea, cholera infantum, intermittent fever, remittent fever, typhoid fever, typho-malarial fever, cholera morbus, dysentery, measles, whooping-cough, inflammation of brain, or inflammation of bowels, the relative humidity of the atmosphere, the average per cent of cloudiness, the ozone, the average velocity of the wind, and the monthly and average daily range of the barometer were **less** than the average for the year; and that in months when **less** than the average per cent of reports stated the presence of diarrhea (or of the other diseases named), these conditions were **greater** than the average for the year.

Explanations of propositions 1 and 2 are given on a preceding page, under the heading, "Climate and Sickness."

A summary relative to the foregoing propositions, is presented in Table 16, near the close of this article.

PROPOSITION 3.—For those months which are not, as regards the absolute humidity of the atmosphere, exceptions to proposition 1, it is true, also, that the quantity of vapor inhaled daily was **greater** than the average, and the quantity exhaled daily in excess of that inhaled was **less** than the average in months when **more** than the average per cent of reports stated presence of diarrhea, or of the other diseases named in propositions 1 and 2; and that **less** vapor was inhaled and a **greater** excess exhaled daily in months when the per cent of reports stating presence of diarrhea or of the other diseases named in propositions 1 and 2 was **less** than the average.

On what per cent of the weekly reports received, by months in the years 1890-1900, the twelve foregoing diseases were reported present, is stated in Table 14, on a subsequent page of this article.

The lines for 1900, relative to the twelve diseases, are graphically represented in Diagrams 1, 3, 4 and 5 in this article.

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* A comparison of meteorological conditions in 1900, with the average for series of years, is given on a preceding page of this article.

TABLE 14.—*By year and months for 1900 and for the preceding year, and averages for the 10 years, 1890-99, stating on what per cent of the weekly reports received* DIARRHEA, CHOLERA INFANTUM, INTERMITTENT FEVER, REMITTENT FEVER, TYPHOID FEVER, TYPHO-MALARIAL FEVER, MEASLES, WHOOPING-COUGH, CHOLERA MORBUS, DYSENTERY, INFLAMMATION OF BRAIN AND INFLAMMATION OF BOWELS, *were reported present, and comparing the per cents for 1900, with the averages for corresponding months in the years specified.*

	Years, etc.	Year.	January.	Feb.	Mar.	April.	May.	June.	July.	August.	Sept.	October.	Nov.	Dec.		Year.	January.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	October.	Nov.	Dec.
Diarrhea.	Av. 10 years, 1890-1899	40	24	24	26	26	27	36	56	72	71	51	29	24	Cholera infantum.	10	1	1	8	1	3	8	20	34	30	12	2	1
	1899	37	19	17	22	27	23	37	53	68	72	47	31	26		8	1	1	0.4	2	0.7	6	17	31	24	8	3	0.6
	1900	40	20	15	19	24	25	36	52	72	75	57	34	24		12	2	1	0.8	3	2	9	17	36	43	13	2	0.7
	In 1900 greater than av. 1890-1899	=	..	...	...	..	..	=	..	=	4	6	5	=		2	1	=	...	2	...	1	..	2	13	1	=	...
	In 1900 less than av. 1890-1899	=	4	9	7	2	2	=	4	=	...	...	...	=		..	...	=	7.2	..	1	...	3	..	...	..	=	0.3
Intermittent fever.	Av. 10 years, 1890-1899	25	19	18	19	24	25	26	29	31	30	28	24	19	Remittent fever.	19	15	14	14	15	17	18	21	23	25	24	20	17
	1899	17	13	12	11	19	19	19	23	21	18	21	17	11		12	7	10	8	11	11	11	13	14	17	16	12	10
	1900	16	12	12	12	13	15	15	12	18	23	24	19	13		11	9	7	1	10	8	9	9	11	14	18	15	15
	In 1900 greater than av. 1890-1899	..	..	...	...	..	..	...	..	...	...	...	...	...		..	...	...	...	..	...	...	..	..	..	..	..	...
	In 1900 less than av. 1890-1899	9	7	6	7	11	10	11	17	13	7	4	5	6		8	6	7	13	5	9	9	12	12	11	6	5	2
Typhoid fever.	Av. 10 years, 1890-1899	10	6	5	4	3	3	5	7	14	18	21	16	10	Typho-malarial fever.	4	2	2	2	2	2	2	3	6	7	8	5	3
	1899	9	3	2	3	3	4	7	7	12	14	21	18	10		1	0.8	0.5	0	0	0	1	3	2	2	3	1	1
	1900	15	6	5	5	6	2	4	11	16	27	33	32	27		3	0.8	0.2	1	0	0.8	0.2	4	6	4	4	5	2
	In 1900 greater than av. 1890-1899	5	=	=	1	3	..	...	4	2	9	12	16	17		..	...	...	...	..	...	...	1	=	..	..	=	...
	In 1900 less than av. 1890-1899	..	=	=	...	..	1	1	..	...	...	...	...	...		1	1.2	1.8	1	2	1.2	1.8	..	=	3	4	=	1
Measles.	Av. 10 years, 1890-1899	8	6	9	12	15	17	14	8	4	2	2	3	4	Whooping-cough.	8	7	7	7	8	8	8	10	10	8	6	7	
	1899	6	2	3	7	11	14	10	9	4	3	2	3	6		4	4	2	2	1	2	3	4	4	5	5	5	8
	1900	13	15	19	31	28	25	23	14	6	4	4	3	4		5	7	5	5	3	4	5	8	8	5	1	2	0.7
	In 1900 greater than av. 1890-1899	5	9	10	19	13	8	9	6	2	2	2	=	=		..	=	...	...	..	...	...	..	..	..	..	..	...
	In 1900 less than av. 1890-1899	..	..	...	...	..	..	...	..	...	...	...	=	=		3	=	2	2	5	4	3	2	2	3	5	5	6.3
Cholera morbus.	Av. 10 years, 1890-1899	13	3	3	3	4	5	13	29	39	33	14	5	3	Dysentery.	14	5	5	5	5	5	9	19	35	37	22	8	5
	1899	10	1	0.5	1	3	4	10	25	32	28	11	4	2		13	3	2	3	3	4	8	23	39	43	18	6	4
	1900	14	3	1	3	3	4	11	22	39	39	20	5	3		14	4	3	2	3	5	9	18	36	42	22	6	3
	In 1900 greater than av. 1890-1899	1	=	...	=	..	..	...	..	=	6	6	=	=		=	...	...	...	..	=	=	..	1	5	=	..	...
	In 1900 less than av. 1890-1899	..	=	2	=	1	1	2	7	=	...	...	=	=		=	1	2	3	2	=	=	1	..	..	=	2	2
Inflammation of brain.	Av. 10 years, 1890-1899	3	2	4	3	4	3	3	3	3	2	2	2	3	Inflammation of bowels.	12	9	9	10	11	10	12	14	17	15	12	9	10
	1899	2	3	3	1	5	1	1	1	0.8	0.5	0.3	0.4	1		10	9	8	8	11	7	10	13	16	14	9	8	8
	1900	1	1	0.7	0.5	1	2	0.5	1	1	2	2	2	0.2		11	9	8	8	11	12	11	12	15	14	11	6	10
	In 1900 greater than av. 1890-1899	..	..	...	..	..	..	...	..	...	=	=	=	...		..	=	..	...	=	2	...	..	..	..	..	..	=
	In 1900 less than av. 1890-1899	2	1	3.3	2.5	3	1	2.5	2	2	=	=	=	2.8		1	=	1	2	=	...	1	2	2	1	1	3	=

COLD-WEATHER DISEASES.

TABLE 15.—*Summary relative to propositions on preceding pages concerning relations by months, in 1900, between greater or less than usual prevalence of diseases named, and certain given coincident climatic conditions.*

Diseases.	Months (inclusive) in which diseases named were more than usually prevalent in 1900.	Months (inclusive) in which diseases named were less than usually prevalent in 1900.	For the 12 months of the year 1900, Number of months in which propositions hold true.*										
			That in months when diseases named were more than usually prevalent the conditions named below were greater than usual, and in months when less than usually prevalent these conditions were less than usual.							That in mos when diseases named were more than usually prevalent the conditions named below were lower than usual, and in months when the diseases were less than usually prevalent these conditions were higher than usual.			
			Relative humidity.	Average per cent of cloudiness.	Ozone.		Velocity of wind.	Atmospheric pressure.		Average temperature.	Average daily range of temp.	Average daily atmospheric pressure.	Absolute humidity.
								Range.					
					Day.	Night.		Monthly.	Av. daily.				
Bronchitis........	Jan.-May, Nov., Dec.	June-Oct........	9	11	8	8	10	10	10	11	10	8	11
Pneumonia.......	Jan.-May, Dec..	June-Nov.......	8	10	9	9	9	9	9	10	9	7	10
Membran. croup.	Sept.-Dec........	Jan.-Aug........	8	7	1	3	7	7	7	6	7	5	6
Diphtheria.......	June, Sept.-Dec.	Jan.-May, July, Aug.	7	6	2	4	6	6	6	5	6	6	5
Tonsillitis.........	Jan.-May, Nov., Dec.	June-Oct........	9	11	8	8	10	10	10	11	10	8	11
Influenza.........	Jan.-May, Dec..	June-Nov.......	8	10	9	9	9	9	9	10	9	7	10
Scarlet fever.....	Jan., Feb., Oct.-Dec.	March-Sept.....	11	10	4	4	10	10	10	9	10	8	9
Rheumatism.....	Jan.-June, Dec.	July-Nov........	7	9	10	10	8	8	8	9	8	8	9
Neuralgia.........	Jan.-May, Nov., Dec.	June-Oct........	9	11	8	8	10	10	10	11	10	8	11
Consumption, pul.	Jan., Feb., June-Oct.	Mar.-May, Nov., Dec.	5	4	6	4	4	4	4	3	4	6	3
Pleuritis..........	Jan.-May, Dec..	June-Nov.......	8	10	9	9	9	9	9	10	9	7	10
Inflam. of kidney.	Jan.-July, Nov.	Aug.-Oct., Dec..	6	8	9	9	7	7	7	8	7	9	8
Cerebro-spi. men.	Feb.-May, Aug.-Oct.	Jan., June, July, Nov., Dec.	5	5	8	8	4	4	4	5	4	2	5
Puerperal fever..	Jan., Mar., June, Sept., Dec.....	Feb., Apr., May, July, Aug., Oct., Nov.	7	8	6	6	8	8	8	7	8	6	7
Erysipelas........	Jan.-Mar., May, July.	April, June, Aug.-Dec.	7	9	8	8	8	8	8	7	8	8	7
Smallpox.........	May-July, Nov., Dec.	Jan.-Apr., Aug.-Oct.	5	7	4	6	6	6	6	5	6	10	5
Average disease..	Jan.-Apr., Aug.-Oct.	May-July, Nov., Dec.	7	6	8	6	6	6	6	7	6	2	7

*** The figures in each of these eleven columns show for how many months out of the twelve months in 1900, the proposition named over the column holds true; thus, concerning bronchitis, the proposition relative to average daily range of temperature held true in eleven months out of the twelve; that relative to average temperature, in ten out of twelve, etc.**

WARM-WEATHER DISEASES.

TABLE 16.—*Summary relative to propositions on preceding pages concerning relations by months, in 1900, between greater or less than usual prevalence of diseases named, and certain given coincident climatic conditions.*

Diseases.	Months (inclusive) in which diseases named were more than usually prevalent in 1900.	Months (inclusive) in which diseases named were less than usually prevalent in 1900.	For the 12 months of the year 1900. Number of months in which propositions hold true.*										
			That in months when diseases named were more prevalent than usual, the conditions named below were higher than usual; and in months when the diseases were less prevalent than usual, these conditions were lower than usual.				That in months when diseases named were more prevalent than usual, the conditions named below were less than usual; and in months when the diseases were less prevalent than usual, these conditions were greater than usual.						
			Average temperature.	Av. daily range of temp.	Absolute humidity.	Av. daily atmospheric pressure.	Atmospheric pressure Range. Monthly.	Atmospheric pressure Range. Av. daily.	Relative humidity.	Av. per cent of cloudiness.	Ozone. Day.	Ozone. Night.	Velocity of wind.
Diarrhea..........	July-Oct	Jan.-June, Nov., Dec.	10	9	10	9	9	9	8	10	9	9	9
Cholera infantum	July-Oct	Jan.-June, Nov., Dec.	10	9	10	9	9	9	8	10	9	9	9
Intermittent fev..	Aug.-Nov.	Jan.-July, Dec..	8	7	8	9	7	7	6	8	9	9	7
Remittent fever..	Sept.-Dec	Jan.-Aug........	6	5	7	7	5	5	4	6	11	9	5
Typhoid fev. (ent.)	Aug.-Dec	Jan.-July........	7	6	7	8	6	6	5	7	10	10	6
Typho-mal. fever	July-Nov	Jan.-June, Dec.	9	8	9	8	8	8	7	9	10	10	8
Measles...........	Jan.-July	Aug.-Dec	5	6	5	4	6	6	7	6	2	2	5
Whooping-cough.	Jan.-Mar., June-Aug...........	Apr., May, Sept.-Dec.	6	5	6	5	5	5	6	6	3	5	5
Cholera morbus ..	July-Oct........	Jan.-June, Nov., Dec.	10	9	10	9	9	9	8	10	9	9	9
Dysentery........	July-Oct........	Jan.-June, Nov., Dec.	10	9	10	9	9	9	8	10	9	9	9
Inflam. of brain...	May, July, Sept.-Nov...........	Jan.-Apr., June, Aug., Dec.	9	8	9	6	8	8	7	8	10	8	8
Inflam. of bowels.	May-Sept	Jan.-Apr., Oct.-Dec.	11	10	11	6	10	10	11	10	6	6	10

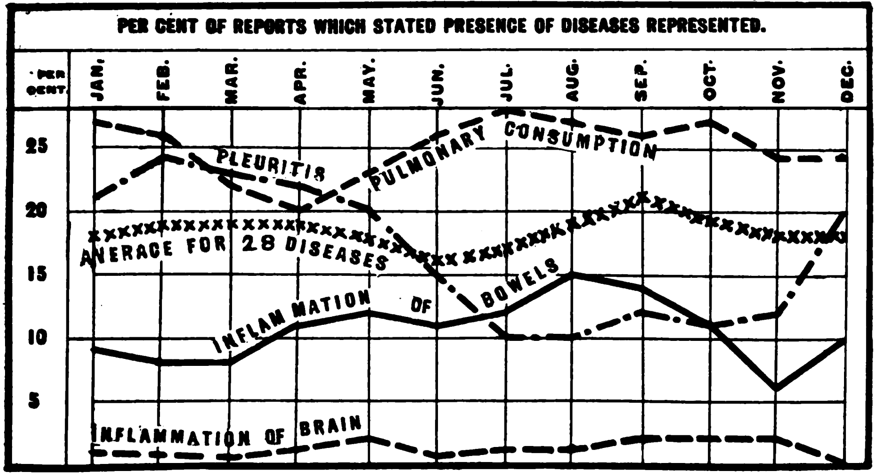
* The figures in each of these eleven columns show for how many months out of the twelve months in 1900 the proposition named over the column holds true; thus, concerning diarrhea, the proposition relative to average daily range of temperature held true in eleven months out of the twelve; that relative to absolute humidity ten months out of the twelve, etc.

Total sickness—average disease.—"Average disease" is an average of the tabulated diseases reported present on all the cards received and compiled at this office during the year. It is probably equivalent to the actual sickness from all diseases printed on the report cards, and probably represents very nearly the average sickness from all the diseases in the State. A sample of the report cards on which diseases are reported to this office is shown on the third page of this article. Twenty-eight diseases are printed on the cards. In 1900 there were 5,513 of these card reports received. On some of the cards only one or two diseases were reported present and on others more. Had each disease (printed on this card, and only the twenty-eight thus named) been reported present on every card received at this office, there would have been 154,364 reports of diseases present. (This is the product of 5,513 reports received multiplied by twenty-eight, the number of diseases printed on the cards, or 100 per cent of the possible disease reports.) There were actually present on the cards received at this office only 28,463 disease reports, which 28,463÷154,364 of the possible disease reports that might have been present, is about 18 per cent. This 18 per cent represents the actual sickness in the State from the tabulated diseases reported present, or in other words the sickness from "average disease." This is shown, by months in Diagram 4, on a preceding page.

Table 17 serves to indicate the probable actual sickness in the State from the tabulated diseases in the years 1890-1900. It compares the sickness, by months, in 1900 with the sickness in each of the ten years, 1890-99, and indicates that the sickness reported in 1900 was, for the year, and, with the exception of September, for each month of the year, less than the average.

On this subject Tables 7 and 8, on preceding pages, and the accompanying remarks, may be studied in connection with the tables and remarks in this part of this article. In Table 7, the order of prevalence of each disease, including the "average disease," is shown as it appears after taking account of the order or prevalence of each disease in the places where it was present, and also the per cent of all reports received on which that disease was reported.

DIAGRAM 4—WEEKLY REPORTS OF SICKNESS IN MICHIGAN, IN 1900.

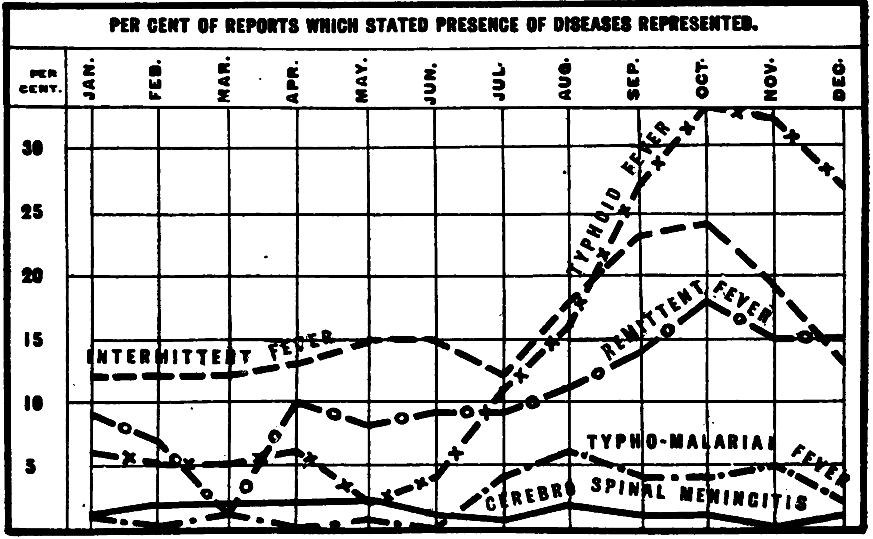


[PLATE 1099]

TABLE 17.—SICKNESS FROM AVERAGE DISEASE, 1890-1900.—*By year and months for each of the years, 1890-1900, stating on an average for such of the 28 diseases tabulated as were reported present, what per cent of the weekly reports received stated presence of the diseases; and comparing the average per cents for months in 1900 with the averages for corresponding months in the 10 years, 1890-99.*

Years, etc.	Annual av.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Average 10 years, 1890-99	20	21	20	21	21	19	18	19	21	21	20	19	20
1890	25	26	26	25	26	25	23	24	27	26	25	25	27
1891	25	27	27	27	27	25	22	23	26	25	24	23	24
1892	21	26	25	24	24	20	19	19	22	23	22	20	23
1893	20	21	21	20	20	19	18	18	21	21	20	20	20
1894	20	20	19	20	20	19	18	18	20	22	20	19	19
1895	20	20	21	22	22	19	18	19	20	19	19	17	18
1896	18	19	19	20	17	16	16	17	18	18	17	17	17
1897	18	18	18	19	18	17	16	17	18	19	19	17	16
1898	17	17	18	17	18	15	14	15	18	18	18	17	18
1899	17	18	19	18	18	16	15	17	17	19	17	17	17
1900	18	18	19	19	19	18	16	17	19	21	19	18	18
In 1900, less than Average, 1890-99	2	3	1	2	2	1	2	2	2	=	1	1	2

DIAGRAM 5—WEEKLY REPORTS OF SICKNESS IN MICHIGAN. IN 1900.



[PLATE 1100]

COMMUNICABLE DISEASES IN MICHIGAN DURING THE YEAR ENDING DECEMBER 31, 1900.

COMPILED UNDER THE DIRECTION OF THE SECRETARY OF THE STATE BOARD OF HEALTH.

This paper continues a subject treated for the preceding year on pages 105-248 of the Report of the State Board of Health for the year 1900, and for former years in previous reports.

Whenever information is received at this office that consumption, diphtheria, typhoid fever, scarlet fever, measles, whooping-cough, meningitis, smallpox, German measles (rötheln), rabies or glanders, is present, or has recently been present in any locality in Michigan, a letter is sent to the health officer of the township, city or village in which the disease is reported to be present (if the name of the health officer has been reported to this office; if not, to the president of the board of health), mentioning the reported existence of the disease within his jurisdiction, indicating his duties and powers and the proper measures to be taken in restricting the disease, transmitting documents of instruction relative to the prevention and restriction of the disease, for distribution among the neighbors of families in which the disease is present,* and asking for a report of the methods employed for the restriction of the disease, and the results of efforts for suppressing it, also the number of cases and deaths in each outbreak. With this letter in each instance, except in case of rabies and glanders, there was sent a blank form (L), or (S for consumption), for the notice of the first case of a dangerous communicable disease, and a blank form (M) for weekly reports during the continuance of the disease. After the outbreak was over, there was sent a blank form (K), (O), (Q), (R) or (U) for a special final report, for the purpose of learning what was done for the restriction and prevention of the disease, by way of isolation and disinfection; also whether or not disinfection was by fumes of burning sulphur or by formaldehyde, and whether either is efficient as a disinfectant, and what quantity of each is required to accomplish disinfection. The blank (K) is for diphtheria, scarlet fever, measles, whooping-cough and rötheln; the blank (O) is for typhoid fever; the blank (Q) for smallpox; the blank (R) for consumption and the blank (U) for meningitis. These blanks for special final reports have been especially prepared, and differ from each other, therefore should be used only for the disease for which each is prepared.

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* It is believed that these documents distributed in this manner are doing great good; for the neighbors of the sick are sufficiently alarmed to read the documents, and are thus led to co-operate in stamping out the disease. Some evidence of the value of this work may be seen further on, in the several articles to which this is an introduction, in tables which show the estimated number of outbreaks of, and cases of sickness from communicable diseases prevented, and lives saved by isolation and disinfection.

In the report of this Board for the year 1895 (pp. 153-174) in the introduction to the articles on the dangerous communicable diseases, are printed tables and diagrams which show the results of restrictive measures recommended by this Board.

TABLE 1.—*Number of all places* in Michigan at which communicable diseases were reported present, also the number of new places† at which each disease was reported present each week in 1900.*

Weeks ending Saturday—		Consumption.		Diphtheria.		Typhoid fever.		Scarlet fever.		Measles.		Whooping-cough.		Meningitis.		Small-pox.	
		Places.*	New places.	Places.	New places.	Places.	New places.	Places.	New places.	Places.	New places.	Places.	New places.	Places.	New places.	Places.	New places.
January......	6..	219	15	34	11	42	14	70	20	61	28	29	12	6	1	5	0
	13..	190	13	32	12	46	10	94	24	78	24	24	7	2	2	2	0
	20..	184	18	42	13	53	14	100	25	105	27	32	4	1	1	1	0
	27..	177	9	34	8	50	19	78	13	99	23	30	10	4	0	3	0
February.....	3..	179	2	37	18	36	5	80	19	88	29	28	4	3	2	3	1
	10..	180	5	37	11	32	7	77	20	86	22	23	4	4	3	3	0
	17..	173	10	20	5	33	6	73	15	91	22	27	6	4	3	3	2
	24..	167	11	16	3	31	7	64	14	80	18	23	5	3	2	3	0
March.........	3..	154	8	22	7	27	6	78	17	91	25	17	2	6	2	8	3
	10..	144	7	20	9	31	5	70	20	97	21	14	4	6	2	9	5
	17..	152	7	23	7	36	6	62	18	108	30	15	4	7	3	9	0
	24..	156	10	20	6	32	12	61	13	113	35	18	4	6	5	7	0
	31..	154	9	21	5	25	12	57	15	112	30	16	7	3	2	9	1
April..........	7..	160	6	20	8	31	10	59	11	110	32	15	1	3	0	8	1
	14..	161	9	17	4	27	12	59	15	114	28	19	9	4	1	6	2
	21..	164	8	16	8	26	5	64	15	107	34	17	6	4	3	6	1
	28..	154	7	15	6	20	6	76	17	124	37	16	5	4	2	9	2
May...........	5..	155	7	17	5	17	2	74	18	108	31	15	2	6	1	8	1
	12..	160	18	22	6	24	12	76	19	127	29	29	7	6	5	9	3
	19..	162	18	28	10	20	9	61	16	122	37	26	6	5	4	9	0
	26..	161	11	24	8	25	6	65	21	106	25	20	4	5	1	11	3
June...........	2..	167	12	24	10	27	8	63	15	93	20	25	4	5	1	9	1
	9..	172	7	22	9	31	7	67	14	91	21	24	5	6	2	9	1
	16..	170	11	25	8	27	9	61	15	84	17	23	2	4	0	8	1
	23..	169	12	23	3	23	8	42	6	78	21	24	4	5	1	7	0
	30..	170	12	19	6	23	6	47	6	61	16	22	6	5	2	7	0
July...........	7..	171	9	17	8	25	2	48	12	66	11	19	5	4	1	8	2
	14..	168	3	22	3	44	7	52	15	60	18	16	0	4	0	6	0
	21..	170	6	19	4	53	17	50	11	68	12	21	0	3	1	6	1
	28..	175	12	20	4	64	21	52	17	63	12	23	4	6	1	1	1
August........	4..	178	9	17	8	62	11	51	12	44	8	25	8	4	4	2	0
	11..	182	3	13	4	75	19	44	7	38	11	22	5	4	0	3	1
	18..	183	10	12	1	94	32	41	8	34	3	17	4	5	2	4	3
	25..	179	2	15	5	90	22	50	13	24	4	20	4	5	1	5	0
September....	1..	170	5	18	4	104	30	54	13	20	2	13	4	5	2	3	2
	8..	171	5	30	12	125	30	58	13	20	6	16	2	6	0	3	1
	15..	173	5	31	10	135	31	49	5	13	3	11	5	5	1	2	0
	22..	175	9	32	16	145	45	51	8	10	1	12	3	3	0	2	0
	29..	177	2	35	8	169	43	62	19	13	4	9	4	3	0	2	0
October......	6..	182	11	42	10	178	57	65	22	9	2	12	6	5	2	1	0
	13..	185	6	41	13	192	48	64	13	12	3	11	0	6	3	4	1
	20..	187	14	38	16	197	43	69	16	9	3	12	2	6	4	8	4
	27..	190	11	40	14	191	46	79	22	13	3	10	4	3	2	12	4
November....	3..	192	6	42	10	175	21	84	18	17	2	9	0	3	0	13	0
	10..	192	7	37	17	169	25	91	23	18	9	9	1	2	2	17	4
	17..	156	10	38	10	160	25	93	14	10	0	10	4	3	0	21	3
	24..	149	3	35	7	159	16	88	12	17	5	11	2	1	1	22	5
December....	1..	150	5	35	5	138	15	90	19	18	6	12	2	3	0	28	4
	8..	149	6	38	14	138	26	96	30	26	2	9	1	5	3	35	12
	15..	149	4	36	11	130	25	91	21	16	2	10	3	4	1	34	8
	22..	150	9	35	11	111	22	82	21	17	6	10	4	3	0	46	12
	29..	155	4	27	5	123	25	93	16	17	5	11	2	1	0	40	8
Av. number of places per week.		169	8	27	8	78	18	68	16	62	16	18	4	4	2	10	2

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* The number of "Places" are copied from the weekly bulletins "Health in Michigan" issued every Wednesday, and include all places at which the several diseases were reported present up to and including Saturday of the calendar week for which each bulletin is issued. "New places" are included in these numbers.

Balance of foot-notes on page 107.

The information contained in the reports upon the above-mentioned blanks and those supplied to health officers of townships, cities and villages, for their annual reports, when returned to this office by the health officers of localities where dangerous communicable diseases have existed, together with other correspondence in regard to outbreaks of such diseases, are the bases on which the various statements made in this article are founded.

It is probable that in previous years, up to the year 1900, every case of smallpox was reported to the Secretary of the State Board of Health; but that cannot yet be said of any other of the diseases in Table 1, and during the present epidemic of a mild form of smallpox, probably it cannot be truthfully said of smallpox. Named in the order of most complete reports, probably these communicable diseases would be arranged as follows: Smallpox, scarlet fever, diphtheria, typhoid fever, measles, consumption.

Some of the purposes of this compilation.—The objects in having the data contained in the various reports received at the office of the secretary compiled, tabulated and published are: First, that facts relative to the ways whereby dangerous communicable diseases are spread in Michigan, and how they are sometimes restricted, and other useful facts, may be submitted to the people of the State, knowledge of which, it is hoped, will enable them to avoid or combat such diseases; and second, by the collation of such data to aid in the progress of sanitary science, especially in so far as it bears on the study of the causes and best measures for the prevention of dangerous communicable diseases in Michigan.

Persistent efforts of this Board have been directed toward impressing the people of the State with the necessity of adopting restrictive measures,—isolation and disinfection, in outbreaks of communicable diseases.

Definition of the term "outbreak" as used in this article.—For studying the influence of isolation and disinfection in restricting outbreaks of communicable diseases, an outbreak is considered as the existence of one or more cases of a particular communicable disease within any health officer's jurisdiction, whether city, village, or township. All cases of the disease occurring within the jurisdiction during the outbreak are considered as part of the outbreak, unless the contagium cannot be traced to cases within the jurisdiction, and can be clearly traced to cases outside of the jurisdiction, in which instance they are considered as constituting a separate outbreak. When a period of over sixty days has elapsed since the last case (in a given jurisdiction), died or recovered, the outbreak is considered as ended,—unless new cases occur the contagium of which can be traced back to the preceding cases, in which instance the latter cases are considered as part of the same outbreak. Possibly the sixty-day limit may, at some future time, be changed to ninety days; but in order to study the subject systematically, there must be a limit in time, as also in area.

The numbers in the first column, "Places," are compiled from the data in card-reports for the sickness statistics, the outbreak reports of communicable diseases, and the weekly reports of communicable diseases.

† The "New places." are those from which the specified diseases were first reported during the calendar week specified in each bulletin. They are compiled from the same sources as are the numbers in the first column of this table and from newspaper reports. Neither of the columns of this table contain *all* the places at which, later, by the "final" and "annual" reports, the diseases were found to have been present.

ABSTRACTS FROM THE QUARTERLY REPORTS OF WORK IN THE OFFICE OF THE SECRETARY, DURING THE YEAR 1900.

Summary relative to the year 1900.—The number of reports of outbreaks of dangerous communicable diseases in Michigan, received from all sources and filed, and the corresponding number concerning which action was taken by this office, during the year 1900, are as follows: For consumption 1,590; for diphtheria (including croup) 465; for typhoid and typho-malarial fever 1,178; for scarlet fever 853; for measles 889; for whooping-cough 301; for meningitis 512, and for smallpox 105. Total for the eight diseases 5,893.

The number of communications relative to dangerous communicable diseases, received and placed on file during the year, was 25,422.

Relative to dangerous communicable diseases, letters, written cards, and demands for weekly and final reports on cards or in the form of the circular letter, were sent out during the year, to the number of 22,570.

TABLE 2.—YEAR 1900.—*Exhibiting the number of outbreaks of consumption, diphtheria, typhoid fever, scarlet fever, measles, whooping-cough, meningitis and smallpox, from January 1 to December 31, 1900, of which notice was received at the office of the Michigan State Board of Health; the per cent of reports, first information concerning which was received through the newspapers; the per cent of newspaper reports which were confirmed by the health officer; the per cent of reports which were denied by the health officer; and the per cent relative to which no reply was received from the health officer.*

Diseases.	Reports from *all* sources, January 1 to December 31, 1900.	Per cent of all reports which were obtained from the newspapers	Per cent of newspaper reports which were confirmed by the health officer.	Per cent of newspaper reports which were denied by the health officer.	Per cent of newspaper reports to which the health officer made no reply to notice sent from this office.
Consumption	* 1,590	3	59	21	20
Diphtheria (includes croup)	* 465	3	58	25	17
Typhoid fever (includes typho-malarial)	* 1,178	6	40	27	33
Scarlet fever	* 853	2	36	28	36
Measles	* 889	5	45	17	38
Whooping-cough	* 301	5	27	27	46
Meningitis	* 512	1	34	33	33
Smallpox	* 105	6	67	33	0
Averages for the eight diseases		4	45	24	31

* The numbers of outbreaks given in this table do not necessarily agree with the numbers given in tables in special articles in this annual report, for the reason that all alleged outbreaks, of which information was obtained from the newspapers and other sources are included in this table. If the health officers denied that such outbreaks occurred, or if they make no response to the letters sent from this office, relative to newspaper reports, such alleged outbreaks are not included in the final compilation of that disease.

The final reports of outbreaks received and filed during the year 1900, were: For consumption 1,796; for diphtheria 405; for typhoid and typho-malarial fever 822; for scarlet fever 717; for measles 843; for whooping-cough 188; for meningitis 438, and for smallpox 50. Total for the eight diseases 5,259.

The registration and return of deaths in Michigan, to the State Department, has resulted in giving this office, during the year 1900, the first information of the occurrence of 1,151 deaths from consumption; 97 deaths from diphtheria and croup; 233 deaths from typhoid and typho-malarial fever; 28 deaths from scarlet fever; 68 deaths from measles; 90 deaths from whooping-cough, and 430 deaths from meningitis. A total for the seven diseases of 2,097.

During the year 1900, the local columns of 11,992 newspapers have been looked over for the reports of the occurrence of communicable diseases. (This work is done by the clerk who acts as messenger and janitor, in the intervals of his performance of other duties.) This has resulted in giving this office first information of the alleged occurrence of 44 cases of consumption; 12 outbreaks of diphtheria; 73 outbreaks of typhoid and typho-malarial fever; 14 outbreaks of scarlet fever; 42 outbreaks of measles; 15 outbreaks of whooping-cough; 3 cases of meningitis and 6 outbreaks of smallpox. A total for the 8 diseases of 209. To what extent the reports of these alleged outbreaks were verified, is shown in the accompanying table (2) on the preceding page.

For the purpose of facilitating the proper action for the restriction of "diseases dangerous to the public health" and to make it possible to compile the important "contagious disease statistics," a record is kept of facts concerning every outbreak of a "disease dangerous to the public health," upon which action is taken by this office, and also of every important communication relating thereto received or sent out. This required 48,000 entries to be made in the "Record Books," one of which books is kept for each dangerous communicable disease. An increase of 10,000 entries over the preceding year.

During the year 1900, compared with the year 1899, action was taken on outbreaks of dangerous communicable diseases as follows: On consumption 162 cases less; on diphtheria 20 outbreaks more; on typhoid and typho-malarial fever 232 outbreaks more; on scarlet fever 149 outbreaks more; on measles 329 outbreaks more; on whooping-cough 33 outbreaks more, and on smallpox 71 outbreaks more, than in 1899. No true comparison can be made relative to meningitis as active work was not commenced upon that disease until the second quarter of 1899, but action has been taken on 85 cases less during the year 1900 than during the last three quarters of 1899. Not including meningitis, action has been taken upon 672 outbreaks more in 1900 than in 1899. Including meningitis 587 outbreaks more were acted upon in 1900 than in 1899.

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CONSUMPTION IN MICHIGAN—YEAR ENDING DECEMBER 31, 1900.

During the year ending December 31, 1900, there were reported to the Secretary of the State Board of Health 2,721 cases including 2,221 deaths from consumption in Michigan.* These reports were received from 837 localities in the State. These numbers are probably less than the actual number of consumption-infected localities in Michigan, and very much less than the actual number of cases. Many cases are of long duration, and in the early stages and sometimes in the latest stages are not under the care of a physician; as a consequence many of these cases are not reported. From many localities the deaths only from consumption are reported; therefore the apparent ratio of deaths to cases is much too high.

CONSUMPTION IN 1900, COMPARED WITH PREVIOUS YEARS.

According to the reports made to the Secretary of the State Board of Health.—The compilation of information relative to the prevalence of consumption in Michigan, as thus reported, was made for the first time for the year 1893. Table 1 shows the reported numbers of cases and deaths from consumption, the number of localities where the disease was reported present, the average numbers of cases and deaths per locality, and the deaths per 100 cases, for each of the years 1893-1900.

TABLE 1.—CONSUMPTION IN MICHIGAN.—*Numbers of reported cases and deaths, number of localities in which they occurred, average number of cases and deaths per locality, and the per cent of cases which proved fatal, as reported for each of the 8 years, 1893-1900.*

Year.	Reported localities.	Reported cases.	Average cases per locality.	Reported deaths.	Average deaths per locality.	Deaths per 100 cases. †
1893	525	1,988	3.8	1,509	2.9	75.9
1894	590	2,060	3.5	1,581	2.7	76.7
1895	626	2,068	3.3	1,613	2.6	78.0
1896	512	2,198	4.3	1,454	2.8	66.2
1897	664	1,715	2.6	1,396	2.1	81.4
1898	922	3,041	3.3	2,727	3.0	89.7
1899	920	2,975	3.2	2,516	2.7	84.6
1900	837	2,721	3.3	2,221	2.7	81.6

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* From many localities the deaths only from consumption are reported; therefore the apparent ratio of deaths to cases is much too high to correctly represent the fatality of the disease; but as time goes on useful information may be gained by a study of the changes likely to occur in this column.

† On a subsequent page the number of deaths from consumption reported to the Secretary of State is stated to be 2,018. Possibly a few deaths from this cause reported to the Secretary of the State Board of Health occurred in "non-registration districts;" but the difference is in great part due to the fact that in the State Department the number is restricted to deaths reported from consumption of the lungs, while the figures here given include a few not so restricted.

According to the reports made to the Secretary of State.—The reports to the Secretary of the State Board of Health, while useful for many purposes, are probably now also useful for comparing the deaths in one year with the deaths in another very recent year. Previous to the year 1898, not all deaths were reported to the Secretary of State, but probably the omissions were about the same in every year until the new law for the registration of deaths took effect, in the latter part of 1897; therefore the statistics of the State Department are useful for comparing one year with another, up to the close of the year 1897.

The following table (2) stating the number of deaths from consumption per 100,000 persons living, reported to the Secretary of State, for each of the thirty-two years 1869-1900, probably quite accurately represents the annual fluctuations of, but not the total deaths from consumption in Michigan during the twenty-nine years, 1869-97. But for the three years 1898-1900 inclusive, the deaths were reported under a new law whereby it is believed that nearly all deaths were reported, whereas previous to that year some of the deaths were not reported.

TABLE 2.—*Exhibiting the number of reported deaths from consumption per 100,000 persons living in Michigan in each of the 32 years, 1869-1900. Compiled from the Secretary of State's Vital Statistics of Michigan. (Population for intercensal years estimated by average annual increase based on National and State censuses.)*

Year.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882	1883.	1884.
Deaths...........	108.1	122.5	106.0	115.1	109.6	102.0	104.9	109.2	110.9	106.1	105.6	111.7	116.1	104.4	112.3	120.8
Year.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
Deaths...........	105.3	107.3	108.7	121.0	104.3	105.4	96.3	95.2	97.7	98.4	105.1	90.4	80.6	90.1	86.5	83.4

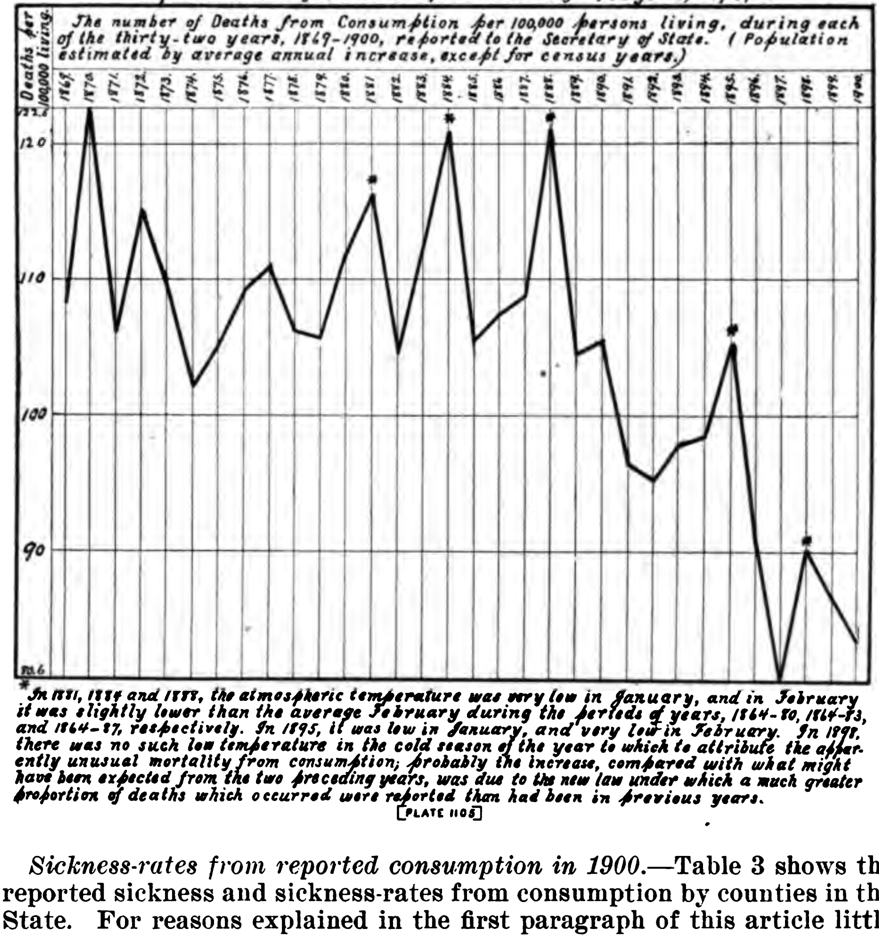
Registration reports to the Secretary of State made under the new law, and the deaths therein reported, classified by the Bertillon system, show that in 1898 there occurred in Michigan 2,153 deaths from consumption—tuberculosis of lungs—a death-rate from that disease of 91.5 per 100,000 of the total population; in 1899 there occurred in Michigan, from the same disease, 2,098 deaths, showing a death-rate of 86.5 per 100,000 of the total population; and in 1900 there occurred in Michigan from the same disease 2,018 deaths, showing a death-rate of 83.4 per 100,000 inhabitants, a decrease of 3.1 per 100,000 in 1900, as compared with 1899.

By Table 2, and more readily by the diagram [Plate 1105], it may be seen that there was a remarkable and unprecedented decrease in the death-rate from consumption in Michigan in 1891, compared with any previous year; it was the first time that the disease had ever decreased so much, and the decrease occurred at a time when influenza was epidemic in this country, and the statistics for the Eastern States show an increase in the death-rate from consumption, which increase was attributed to the influence of the epidemic influenza.

Possible causes for the above-mentioned decrease in consumption in Michigan, are explained in the annual report of this Board for 1898, page 319.

The accompanying diagram [Plate 1105] graphically represents the figures contained in Table 2.

Reported Deaths from Consumption in Michigan, 32 years, 1869-1900.



The number of Deaths from Consumption per 100,000 persons living, during each of the thirty-two years, 1869-1900, reported to the Secretary of State. (Population estimated by average annual increase, except for census years.)

*In 1881, 1884 and 1888, the atmospheric temperature was very low in January, and in February it was slightly lower than the average February during the periods of years, 1864-80, 1864-83, and 1864-87, respectively. In 1895, it was low in January, and very low in February. In 1898, there was no such low temperature in the cold season of the year to which to attribute the apparently unusual mortality from consumption; probably the increase, compared with what might have been expected from the two preceding years, was due to the new law under which a much greater proportion of deaths which occurred were reported than had been in previous years.

[PLATE 1105]

Sickness-rates from reported consumption in 1900.—Table 3 shows the reported sickness and sickness-rates from consumption by counties in the State. For reasons explained in the first paragraph of this article little reliance can be placed on the completeness of the reports of cases on which these particular sickness-rates are based. They are worked out in the hope that in the near future they may be made more valuable. For comparison of sickness from consumption by months, and for the year 1900 with preceding years, reference should be made to the article on "Time of greatest prevalence of each disease," on preceding pages of this volume.

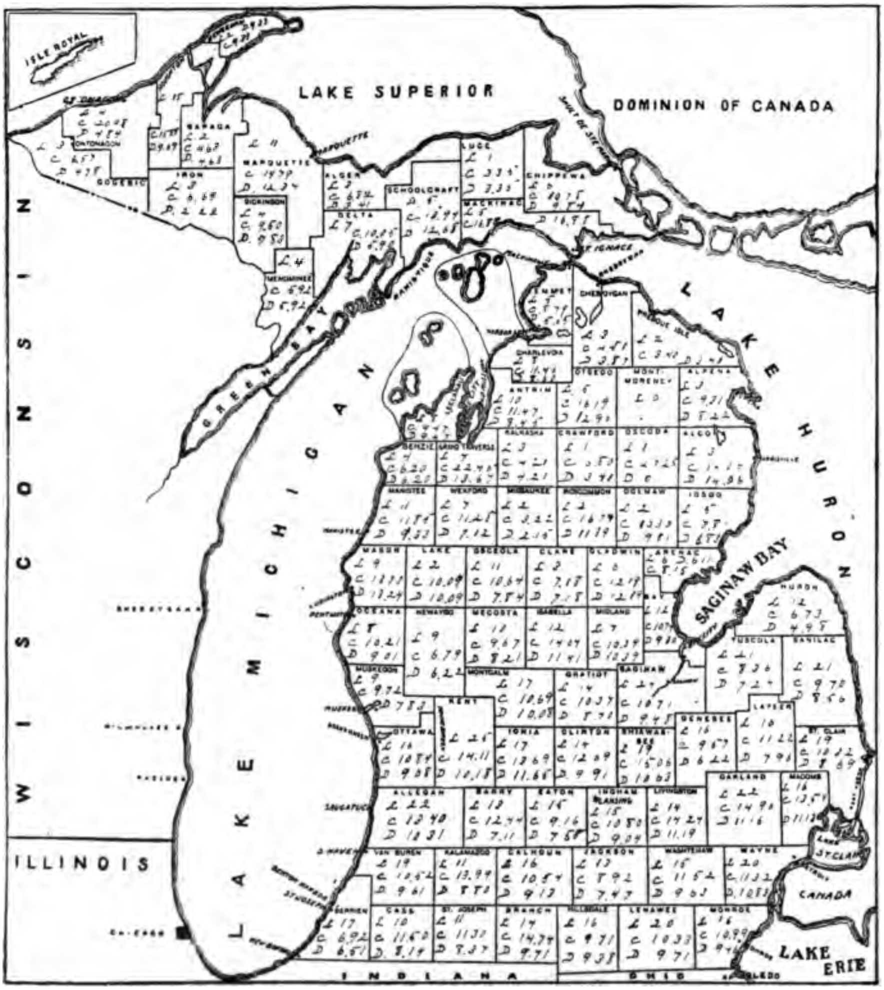
Death-rates from reported consumption in 1900.—Table 3 shows that the death-rate from consumption reported for the whole State in 1900 was 9.17 deaths per 10,000 persons living in the State. Converting this into the form of statement used above with reference to the State Department statistics, it becomes 91.7 deaths per 100,000 persons living; and this differs very much from the rate shown by the State Department.

The explanation of this difference is that, whereas the statement by the Department of State includes only deaths from consumption of lungs (2,018), Table 3 includes all deaths from *consumption* reported to this office (2,221) irrespective of the part of the body in which the disease was located.

The county having the highest death-rate (16.88 deaths per 10,000 of population) was Mackinac. That having the lowest death-rate (2.15) was Missaukee.

DISTRIBUTION OF CONSUMPTION IN MICHIGAN IN 1900.

BY COUNTIES, THE REPORTED CASES AND DEATHS PER 10,000 INHABITANTS. INCLUDES ALSO ALL SUCH DEATHS REPORTED TO THE STATE DEPARTMENT.



L = Localities. O = Outbreaks. C. = Cases per 10,000 population. D = Deaths per 10,000 population.

[PLATE 1102]

TABLE 3.—*Numbers of cases and deaths reported from* **consumption** *and the numbers of reported cases and deaths per 10,000 persons living in each county in Michigan during the year 1900. (Compiled from reports of health officers, etc.)*

Counties.	Population for 1900.	Number of reported		Number per 10,000 population, of	
		Cases.	Deaths.	Cases.	Deaths.
State	2,420,982	2,721	2,221	11.24	9.17
Alcona	5,691	8	8	14.06	14.06
Alger	5,868	4	2	6.82	3.41
Allegan	38,812	52	40	13.40	10.31
Alpena	18,254	17	15	9.31	8.22
Antrim	16,568	19	14	11.47	8.45
Arenac	9,821	8	6	8.15	6.11
Baraga	4,320	2	2	4.63	4.63
Barry	22,514	28	16	12.44	7.11
Bay	62,378	67	58	10.74	9.30
Benzie	9,685	6	6	6.20	6.20
Berrien	49,165	34	32	6.92	6.51
Branch	27,811	41	27	14.74	9.71
Calhoun	49,315	52	45	10.54	9.13
Cass	20,876	24	17	11.50	8.14
Charlevoix	13,956	16	12	11.46	8.60
Cheboygan	15,516	7	6	4.51	3.87
Chippewa	21,338	23	21	10.78	9.84
Clare	8,360	6	6	7.18	7.18
Clinton	25,136	32	25	12.69	9.91
Crawford	2,943	2	1	6.80	3.40
Delta	23,881	24	20	10.05	5.90
Dickinson	17,890	17	14	9.50	7.83
Eaton	31,668	29	24	9.16	7.58
Emmet	15,931	14	9	8.79	5.65
Genesee	41,804	40	26	9.57	6.22
Gladwin	6,564	8	8	12.19	12.19
Gogebic	16,738	11	8	6.57	4.78
G'd Trav'se	20,479	47	28	22.46	13.67
Gratiot	29,889	32	26	10.37	8.70
Hillsdale	29,865	29	28	9.71	9.38
Houghton	66,063	105	64	15.89	9.69
Huron	34,162	23	17	6.73	4.98
Ingham	39,818	43	36	10.80	9.04
Ionia	34,329	47	40	13.69	11.65
Iosco	10,246	8	7	7.81	6.83
Iron	8,990	6	2	6.67	2.22
Isabella	22,784	32	26	14.04	11.41
Jackson	48,222	43	36	8.92	7.47
Kalamazoo	44,310	62	39	13.99	8.80
Kalkaska	7,133	3	3	4.21	4.21
Kent	129,714	183	132	14.11	10.18
Keweenaw	3,217	3	3	9.33	9.33
Lake	4,957	5	5	10.09	10.09
Lapeer	27,641	31	22	11.22	7.96
Leelanau	10,556	10	10	9.47	9.47
Lenawee	48,406	50	47	10.33	9.71
Livingston	19,664	28	22	14.24	11.19
Luce	2,983	1	1	3.35	3.35
Mackinac	7,703	13	13	16.88	16.88
Macomb	33,244	45	37	13.54	11.13
Manistee	27,856	33	26	11.85	9.33
Marquette	41,239	61	51	14.79	12.37
Mason	18,885	26	25	13.77	13.24
Mecosta	20,693	20	17	9.67	8.21
Menominee	27,046	16	16	5.92	5.92
Midland	14,439	15	15	10.39	10.39
Missaukee	9,308	3	2	3.22	2.15
Monroe	32,754	36	31	10.99	9.46
Montcalm.	32,754	35	33	10.69	10.08
Montmorency.	3,234	......	......	......	....
Muskegon	37,036	36	29	9.72	7.83
Newaygo	17,673	12	11	6.79	6.22
Oakland	44,792	67	50	14.96	11.16
Oceana	16,644	17	15	10.21	9.01
Ogemaw	7,765	8	7	10.30	9.01
Ontonagon	6,197	13	3	20.98	4.84
Osceola	17,859	19	14	10.64	7.84
Oscoda	1,468	4	0	27.25	0
Otsego	6,175	10	8	16.19	12.96
Ottawa	39,667	43	36	10.84	9.08
Presque Isle	8,821	3	3	3.40	3.40
Roscommon	1,787	3	2	16.79	11.19
Saginaw	81,222	87	77	10.71	9.48
Sanilac	35,055	34	30	9.70	8.56
Schoolcraft	7,889	11	10	13.94	12.68
Shiawassee	33,866	51	36	15.06	10.63
St. Clair	55,228	57	48	10.32	8.69
St. Joseph	23,889	27	20	11.30	8.37
Tuscola	35,890	30	26	8.36	7.24
Van Buren	33,274	35	32	10.52	9.61
Washtenaw	47,761	55	46	11.52	9.63
Wayne	348,793	395	378	11.32	10.83
Wexford	16,845	19	12	11.28	7.12

TABLE 4.—*Exhibiting by months, the number of deaths from consumption, in Michigan for the year 1900, and the averages for the six years 1894-99, as reported to the State Board of Health; also exhibiting by months, the number of deaths from pulmonary consumption for the year 1900, and the averages for the six years 1894-99, as reported to the Secretary of State.*

Year.	Total number.	Number of deaths for each month.											
		Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1900	2,168	183	192	216	186	216	176	164	162	171	151	178	173
Av. 6 years, 1894-99	1,289	102	106	105	112	119	93	84	95	89	120	123	141
1900*	2,018	168	180	202	187	205	161	158	150	159	140	158	150
Av. 6 years, 1894-99*	2,137	157	162	202	208	206	170	154	178	162	171	177	190

* The last two lines in Table 4 are the number of deaths from pulmonary consumption by months as reported to the Secretary of State.

The first two lines in Table 4 show that in 1900, as compared with the average for the six years 1894-99, there was a large apparent increase in the number of deaths from consumption. This apparent increase may not be real, but due to a larger proportion of the actual deaths being reported since the new registration law became operative, as, in addition to the deaths reported directly to this office, others reported to the Secretary of State, of which we have not been notified by health officers, are received at this office from the bureau of Vital Statistics in the State Department.

The last two lines of Table 4 show the number of deaths from pulmonary consumption by months, as reported to the Secretary of State.

The maximum number of deaths from pulmonary consumption for 1894-99 occurred in April, the minimum number in July.

The maximum number of deaths from all forms of consumption as reported to this office for the years 1894-99, occurred in December, the minimum number in July.

Source of contagium of consumption.—Of the 2,721 reported cases of consumption during the year 1900, the local health officers reported the source of contagium as follows: Traced to a former case, 167; cold or exposure, 149; inherited, 122;* from outside jurisdiction, 68; la grippe, 64; pneumonia, 23; general debility, 16; from injury, 14; catarrh, 12; measles, 11; overwork, 8; bronchitis, 6; from the asylum, 6; from typhoid fever, 6; whooping-cough, 6; influenza, 6; childbirth, 5; milk from tuberculous cows, 5; dissipation, 5; pleurisy, 3; hemorrhage, 3; scarlet fever, 2; abscess, 2; cough, 2; rheumatism, 2; asthma, 2; syphilis, 2; larynx, 2; acquired, 2; unsanitary conditions, 2; hydrothorax, 2; whooping-cough and pregnancy, 1; meningitis, 1; throat, 1; measles and scarlet fever, 1; autoinoculation, 1; dried sputum swept up, 1; wound, 1; glandular and asthma, 1; epilepsy, 1; sporadic, 1; stomach and heart, 1; dropsy of heart, 1; congestion of lungs, 1; miscarriage, 1; bowel trouble, 1; la grippe and caring for a horse with inflammation of lungs, 1; glands, 1; sequæla of pneumonia, 1; large neck which crowded the lungs, 1; eating fruit infected by consumptive sister, 1; swimming, 1; tubercular cystitis, 1; diabetic gangrene, 1; diarrhea, 1; consumption of blood, 1; lung fever, 1; scrofulous and bad tonsils, 1; working over heat, drying plaster, 1; hip disease, 1; idiopathic, 1; malaria, 1; unknown, 507; and source not stated, 1,458; total, 2,721.

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* There is reason to believe that most of the reports which stated the disease to be "inherited" were made because of the belief of the reporters in the transmission of the disease in that manner, but that most such reports are made without sufficient proof to satisfy any scientific investigator.

TABLE 5.—*Exhibiting, by sex, in certain age-groups, the number of cases and the number of deaths from consumption; the per cent that the cases in each group were of all cases; the per cent that the deaths in each group were of all deaths; and the per cent that the deaths in each group were of the cases in that group. Compiled from all reports for the year 1900 which stated the ages.*

	Number and per cent of cases and deaths in certain age-groups.																
Ages in groups of years.	Sex.	All known ages.*	Under 10 years.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 to 54.	55 to 59	60 to 64.	65 to 69.	70 to 74.	75 years and over.
No. of cases...	Males...	1,103	44	17	74	151	168	120	106	99	88	70	45	47	34	20	20
	Females	1,401	43	34	166	228	240	169	139	94	72	48	46	33	45	21	23
Per cent the cases in each group were of all cases of known ages..	Males...	......	4.	1.5	6.7	13.7	15.2	10.9	9.6	9.	8.	6.3	4.1	4.3	3.1	1.8	1.8
	Females	......	3.1	2.4	11.8	16.3	17.1	12.1	9.9	6.7	5.1	3.4	3.3	2.4	3.2	1.5	1.6
No. of deaths.	Males...	949	41	13	64	131	148	100	92	77	75	65	40	39	30	15	19
	Females	1,213	39	30	138	200	217	147	117	78	62	38	35	30	41	18	23
Per cent the deaths in each group were of cases in that group...	Males...	86.0	93.2	76.5	86.5	86.8	88.1	83.3	86.8	77.8	85.2	92.9	88.9	83.	88.2	75.0	95.0
	Females	86.6	90.7	88.2	83.1	87.7	90.4	87.	84.2	83.	86.1	79.2	76.1	90.9	91.1	85.7	100.
Per cent the deaths in each group were of all deaths at known ages..	Males...	......	4.3	1 4	6.7	13.8	15.6	10.5	9.7	8.1	7.9	6.8	4.2	4.1	3.2	1.6	2.0
	Females	......	3.2	2.5	11.4	16.5	17.9	12.1	9.6	6.4	5.1	3.1	2.9	2.5	3.4	1.5	1.9
Per cent the deaths in special groups were of all deaths at known ages..	Males...	......	5.7		36.1			28.3			29.8						
	Females	......	5.7		45.8			28.2			20.4						

* Does not include those cases or deaths where the age was not stated.

How consumption is most commonly spread.—The tubercle bacillus, the specific cause of consumption, is found in a living state in the sputa from the lungs of persons suffering from that disease. The dust of dried tubercular sputum, when inhaled by susceptible persons, is thought to be the most common way of transmitting pulmonary consumption from person to person. The members of a family or household in which there is a consumptive person may be constantly exposed to the danger of infection, unless the sputa are carefully collected and destroyed. The object of much of the work done by the State Board of Health is to cause the prompt destruction of infected sputa before it is allowed to become dry, and to educate the people in this simple means of restricting the spread of consumption.

The little droplets or moist spray thrown out from the mouth of consumptives in coughing and in forcible speaking has been found to contain the germs of the disease. The ordinary breath of a consumptive does not contain them.

Ages of greatest prevalence of, and mortality from, consumption.—In Table 5 are shown the numbers of cases and deaths from consumption in Michigan in 1900, in which the ages were stated in the health officers' reports. In this table the cases and deaths are arranged in *age-groups,* showing what per cent the cases in each group were of all cases; the per cent that the deaths in each group were of all deaths; the per cent the deaths in each group were of the cases in that group, and the per cent the deaths in principal groups were of all deaths.

TABLE 6.—AGE DISTRIBUTION OF DECEDENTS FROM CONSUMPTION: *Exhibiting, by sex, the persons who died of consumption, during the year 1900, and also during the years 1894-99, the number, the average number, and per cent in each period of age. (Compiled from such reports to the State Board of Health, as stated sex and age.)*

Year.	1900.						1894-99.								
	Number.			Per cent.			Number.			Per cent.			Av. Number.		
Age at death, in periods of years.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.
Under 10	41	39	80	4	3	4	99	133	232	3	4	3	17	22	39
10 to 20	77	168	245	8	14	11	253	558	811	9	15	12	42	93	135
20 to 30	279	417	696	29	34	32	830	1,204	2,034	28	32	30	138	201	339
30 to 40	192	264	456	20	22	21	591	842	1,433	20	22	21	99	140	239
40 to 50	152	140	292	16	12	14	414	436	850	14	12	13	69	73	142
50 to 60	105	73	178	11	6	8	328	261	589	11	7	9	55	44	98
60 to 70	69	71	140	7	6	6	241	225	466	8	6	7	40	38	78
70 to 80	29	36	65	3	3	3	143	105	248	5	3	4	24	18	41
Over 80	5	5	10	.5	.4	.5	16	8	24	.5	.2	.4	3	1	4
All ages	949	1,213	2,162	44	56	100	2,915	3,772	6,687	44	56	100	486	629	1,115

Table 6 shows, also, that for the year 1900 and for the six years, 1894-99, the greatest per cent of deaths was in persons between twenty and thirty years of age, the next greatest per cent between thirty and forty years of age. Also that the per cent of deaths in each age period is about the same in 1900 as in the six years preceding.

Average age of decedents from consumption.—The average age of decedents from consumption in 1900 was 36 years for males, and 32.9 years for females. The average age of death of males for six years, 1894-99, was 37.3 years, and for females, 32.7 years.

Duration of consumption.—Fatal and non-fatal cases.—By Table 7 it may be seen that from reports received for 1900 and for the years 1894-99, which stated the interval between the time of being taken sick and the time of death from consumption, the largest per cent of both males and females were sick less than one year. The next highest per cent of decedents were sick from one to two years, and as the duration of sickness grew longer the per cent of deaths decreased. The average duration of fatal cases reported in the six years, 1894-99, was, for males 20.0 months and for females 23.8 months.

TABLE 7.—*Exhibiting, by sex of patient, the duration in months and years of fatal cases of sickness from consumption, in Michigan, during the year 1900, and the average for the 5 years 1894-99, arranged in time periods. (Compiled from those reports which stated the length of time the patient was sick.)*

Year.	Sex.	No. of cases included.	Fatal cases of consumption.																	
			Duration of sickness:—Per cent of deaths in each period.																	
			All cases.	1 Month.	2 Months.	3 Months.	4 Months.	5 Months.	6 Months.	7 Months.	8 Months.	9 Months.	10 Months.	11 Months.	Under one year.	1 to 2 yrs.	2 to 3 yrs.	3 to 4 yrs.	4 to 5 yrs.	Five years and over.
1900.	Males........	640	100	4.8	5.2	6.9	6.3	3.6	8.6	3.9	3.0	3.0	2.0	3.1	50.3	22.8	11.7	5.9	3.0	6.3
	Females	878	100	3.6	5.6	8.1	5.4	5.4	5.4	4.1	3.5	3.5	2.4	2.3	49.2	22.9	11.6	6.5	2.8	5.7
Av. 1894-'99.	Males........	309	100	6.5	4.2	4.2	4.9	5.5	7.4	4.2	3.9	3.9	3.2	2.3	50.5	24.6	12.0	4.9	2.3	5.8
	Females	427	100	4.0	4.2	5.4	5.2	5.2	6.8	4.9	4.7	5.2	3.0	3.0	51.5	24.4	11.2	5.4	2.1	5.6

By Table 8 it may be seen that, from the reports of non-fatal cases of consumption during the six years 1894-99, the highest per cent were sick under one year, the next highest per cent were sick from one to two years, and as the duration grew longer the per cent of cases decreased. The average duration of sickness in non-fatal cases of consumption during the six years 1894-99 was, in males 16.4, and in females 16.1 months.

TABLE 8.—*Exhibiting, by sex of patient, the duration in months and years, of non-fatal cases (still sick) of consumption, in Michigan, in the year 1900 and average of the same for the years 1894-99, as stated in the reports to the State Board of Health.*

Year reported.	Sex.	No. of cases included.	Non-fatal cases of consumption.																		
			Duration of sickness:—Per cent of cases in each period.																		
			All periods.	1 Month.	2 Months.	3 Months.	4 Months.	5 Months.	6 Months.	7 Months.	8 Months.	9 Months.	10 Months.	11 Months.	Under 1 yr.	1 to 2 yrs.	2 to 3 yrs.	3 to 4 yrs.	4 to 5 yrs.	5 to 9 yrs.	Ten years and over.
1900.	Males......	106	100	3.8	3.8	6.6	1.9	4.7	2.8	6.6	6.6	2.8	5.7	3.8	49.1	31.1	13.2	3.9	1.9	0	.9
	Females ..	137	100	5.8	5.1	5.1	3.6	3.6	2.2	2.2	4.4	6.6	4.4	4.4	47.4	26.3	10.9	7.3	0	2.9	3.6
Av. 1894-'99.	Males......	34	100	5.9	2.9	8.8	5.9	5.9	0.1	2.9	5.9	2.9	5.9	5.9	55.9	23.5	11.8	5.9	0.1	2.9	0.9
	Females ..	44	100	4.5	6.8	6.8	4.5	2.3	6.8	4.5	4.5	6.8	4.5	4.5	56.8	27.3	9.1	4.5	0.1	2.3	0.7

Cases of consumption reported as having recovered.—In the reports relative to consumption received at this office during the years 1894-1900, seventy-four cases* were said to have recovered from the disease; eleven of these cases were reported in 1894, six in 1895, seven in 1896, nine in 1897, eight in 1898, eight in 1899, and twenty-five in 1900; they are tabulated below according to sex, age and duration:—

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* Sex, age and duration not stated in six cases reported as having recovered.

Sex.	Age.	Duration.	Sex.	Age.	Duration.
Males.....	14 years.	Not stated.	Females..	21 years.	2 years and 8 months.
	18 years.	7 months.		19 years.	5 months.
	27 years.	4 months.		35 years.	3 months.
	Not stated.	3 years and 10 months.		Not stated.	1 year.
	41 years.	Not stated.		37 years.	2 months.
	19 years.	7 months.		20 years.	Not stated.
	27 years.	8 months.		22 years.	Not stated.
	29 years.	1 year.		16 years.	Not stated.
	26 years.	4 months.		36 years.	9 months.
	34 years.	Not stated.		Not stated.	Not stated.
	26 years.	Not stated.		35 years.	3 months.
	35 years.	2 years.		20 years.	2 months.
	47 years.	3 months.		42 years.	8 months.
	35 years.	1 month.		30 years.	Not stated.
	42 years.	1 year.		31 years.	13 months.
	Not stated.	Not stated.		24 years.	6 months.
	Not stated.	Not stated.		Not stated.	Not stated.
	24 years.	16 months.		4 years.	14 months.
	35 years.	Not stated.		38 years.	36 months.
	35 years.	23 months.		Not stated.	5 months.
	21 years.	10 months.		6 years.	2 months.
	Not stated.	Not stated.		17 years.	Not stated.
	Not stated.	39 months.		18 years.	7 months.
	5 years.	1 month.		19 years.	Not stated.
	16 years.	12 months.		24 years.	8 months.
	16 years.	3 months.		28 years.	24 months.
	22 years.	1 month.		43 years.	Not stated.
	37 years.	Not stated.		62 years.	17 months.
	40 years.	18 months.		Not stated.	7 years.
	45 years.	4 months.		19 years.	8 months.
	60 years.	8 months.		Not stated.	Not stated.
	64 years.	9 months.		43 years.	12 months.
	Not stated.	Not stated.		Not stated.	Not stated.
	Not stated.	4 months.			
	Not stated.	Not stated.			

The average age of the twenty-seven male cases, where the ages were stated, was 31.1 years; of the twenty-six female cases, 27.3 years.

The average duration of sickness, where the time was stated, was for males, 11.3 months; for females, 14.2 months.

Location of the disease, reported in 5,321 instances.

Lungs	4,456
Lungs and bowels	121
Lungs and throat	91
Bowels	85
General	71
Chest	62
Throat	43
Stomach	26
Bronchi	24
Lungs and stomach	23
Larnyx	15
Lungs and bronchi	14
Lungs and larynx	14
Liver	13
Thorax	12
Hip joint	10
Lungs and intestines	8
Intestines	8
Abdomen	8
Stomach	7
Lungs and abdomen	7
Brain	7
Lungs and chest	7
Lungs and kidney	6
Lungs and liver	6
Glands and neck	6
Left side	5
Lungs and peritoneum	5
Lungs and heart	5
Lungs and glands	5
Peritoneum	5
Lungs, stomach and bowels	4
Head and lungs	4
Liver, stomach and bowels	4
Lungs and rectum	4
Knee joint	4
Lungs and meninges	4
Spine	3
Hip joint and lungs	3
Side	3
Larynx and bronchi	3
Lungs and pleural cavity	3
Miliary	2
Knee and lungs	2
Mesentery and lungs	2
Spine and lungs	2
Lungs and alimentary canal	2
Mesenteric gland	2
Lungs and bladder	2
Abscess in back	2
Leg	2
Face and lungs	2
Womb	2
Lungs, kidney and bladder	2
Respiratory organ	2
Heart	2
Lungs, abdomen and bladder	2
Bowels, lungs and larynx	2
Lungs and joints	2
Thorax and abdomen	2
Blood	2
Lungs, larynx and intestines	2
Lungs and kidneys	2
Lungs and iliac	2
Fibrous	2
Neck	2
Stomach, bowels and brain	1
Throat and chest	1
Lungs, lower maxilla and bladder	1
Kidney	1
Inguinal	1
Ovaries	1
Spleen	1
Alimentary	1
Liver and bowels	1
Back and hips	1
Bowels and bronchi	1
Stomach and bronchi	1
Liver, lungs and spleen	1
Throat and kidneys	1
Hip, knee and lungs	1
Lungs and foot	1
Trachea	1
Lungs and neck	1
Bronchi and trachea	1
Viscera	1
Lungs, stomach and liver	1
Heart, lungs and liver	1
Lungs and thorax	1
Thigh, hip and kidneys	1
Lungs, liver and kidneys	1
Kidneys, spleen and liver	1
Glands and bowels	1
Lungs, peritoneum and brain	1
Heart and kidneys	1
Stomach	1
Arm, hand and brain	1
Kidney and bladder	1
Mastoid abscess	1
Stomach and throat	1
Throat and larynx	1
Chest and abdomen	1
Lungs and spine	1
Shoulder joint	1
Throat and tongue	1
Breast	1
Back and thigh	1
Throat and trachea	1
Lungs and brain	1
Bowels and meninges	1
Throat and bronchi	1
Pelvis	1
Lungs, abdomen and stomach	1
Bowels and rectum	1
Stomach and kidneys	1
Bones	1
Bronchial	1
Lungs and cerebrum	1
Lungs, throat and bowels	1
Lungs, liver and throat	1
Kidneys, bladder and lymphatic glands	1
Heart, liver and stomach	1
Lungs, throat, liver and spleen	1
Lungs, spine, brain and kidneys	1
Tissues	1

Consumptive relatives, reported in 1,885 instances.

Sister	335
Mother	257
Brother	189
Father	152
Aunt	92
Daughter	73
Brother and sister	66
Grandparents	55
Mother and sister	51
Wife	49
Husband	49
Cousin	42
Uncle	39
Father and sister	36
Father and mother	33
Father and brother	23
Son	20
Mother and brother	19
Mother, sister and brother.	17
Niece	15
Uncle and aunt	14
Father, mother and sister	10
Aunt and grandmother	9
Nephew	7
Brother-in-law	6
Father, brother and sister	6
Mother and aunt	6
Relatives	5
Wife and daughter	5
Daughter and son	5
Father, mother, brother and sister	5
Aunt and sister	5
Father and cousin	4
Two sons and daughter	4
Sister and husband	4
Mother and two sisters	4
Second cousin	4
Half sister	4
Great aunt	4
Husband and daughter	3
Father, mother and brother	3
Cousin and aunt	3
Mother and uncle	3
Cousin and uncle	3
Grandmother, aunt and uncle	2
Two brothers and daughter	2
Brother and four sisters	2
Two half sisters	2
Daughter and son-in-law	2
Father and uncle	2
Grandmother and uncle	2
Great grandmother	2
Two aunts	2
Two brothers	2
Aunt and grandfather	2
Sister and niece	2
Sister and cousin	2
Father and aunt	2
Four children	2
Stepdaughter	2
All the family	2
Father, brother and uncle	2
Daughter-in-law	2
Father, wife and brother	1
Father's family	1
Mother and two brothers	1
Son, daughter and grandchild	1
Mother, two brothers, five sisters, grandmother and great grandmother	1
Mother and uncle	1
Mother, grandfather and uncle	1
Mother, brothers and sister	1
Second wife, stepfather and sister	1
Grandparents, four sisters and brother	1
Grandmother, aunt and father	1
Grandmother and two sisters	1
Ancestors	1
Mother and grandfather	1
Brother and husband	1
Parents and aunt	1
Great grandmother, uncle and aunt	1
Mother and son	1
Mother and wife	1
Grandfather	1
Mother and cousin	1
Brother and cousin	1
Sister, uncle, mother and aunts	1
Grandfather and father	1
Grandmother and father	1
Three sisters and father	1
Husband and son	1
Grandfather, sister and aunt	1
Great aunt and uncle	1
Two brothers, seven nieces and nephews	1
Brother, sister, uncles and father	1
Parents, four sisters and two brothers	1
Husband, daughter and sister-in-law	1
Son-in-law and grandchild	1
Fourteen children	1
Mother, father and husband	1
Uncle and two cousins	1
Brother and wife	1

Consumptive relatives, reported in 1,885 instances.—Concluded.

Mother-in-law	4
Grandchild	4
Sister and daughter	3
Wife and son	1
Sister, cousin and wife	1
Father, three sisters and brother	1
Cousin, aunt, father and sister	1
Husband and sister	1
Mother, brother and half brother	1
Twin brother	1
Father and wife	1
Grandmother and wife	1
Daughter, mother and uncle	1
Two children of a sister	1
Stepfather	1
Cousin and nephew	1
Wife, mother and cousin	1
Mother, sister and father	1
Mother, two sisters and two aunts	1
Father, aunt and sister	1
Stepdaughter	1
Father, mother, grandfather and two aunts	1
Wife, sons and daughter	1
Sister, uncle and grandfather	1
Grandparents	1
Mother, brother and sister	1
Husband and stepdaughter	1
Brother and mother-in-law	1
Father-in-law	1
Son-in-law	1
Grandfather, mother, brothers and sisters	1
Mother and grandmother	1
Mother, grandmother and aunt	1
Grandfather, three aunts and uncle	1
Grandfather and aunts	1
Father, stepfather and sister	1
Mother, uncle and sister	1
Uncle, aunts and cousin	1
Mother, brother and daughter	1
Father and son	1
Aunt and brother	1
Sister-in-law	1
Mother, grandmother and two sisters	1
Mother, father and grandparents	1
Mother, sister and husband	1
Great grandfather	1
Daughter and brother	1
Father and son	1
Mother and mother's family	1
Mother and daughter	1
Uncle, mother and sister	1
Brother, aunt and cousin	1
Cousin and brother-in-law	1
Wife and granddaughter	1
Niece and nephew	1
Sisters, brothers and niece	1
Father, niece and brother	1
Sister and grandparents	1
Stepmother	1
Father, uncle and sister	1
Brother, sister, son and daughter	1
Husband and children	1
Half brother	1

Consumptive associates were reported in 997 instances, as follows:

Sister	175
Mother	124
Brother	107
Father	78
Daughter	42
Mother and sister	39
Husband	37
Aunt	36
Wife	35
Brother and sister	32
Mother and father	20
Sister-in-law	3
Wife and sister	2
Father and grandmother	2
Parents and aunt	2
Stepmother	2
Brother and cousin	2
Two brothers and daughter	2
Relative by marriage	2
Husband and daughter	2
Father, brother and uncle	2
Grandson	2
Daughter, mother, uncle	1
Son-in-law	1
Brother's wife	1
Uncle and cousin	1
Uncles, aunts and cousins	1
Mother, brother and daughter	1
Father and son	1
Aunt and brother	1
Mother, father and grandparents	1

Consumptive associates were reported in 997 instances, as follows:—Con.

Father and sister	19
Cousin	16
Grandmother	13
Father and brother	12
Son	11
Brother and mother	11
Mother, brother and sister	10
Uncle	9
Friend	8
Niece	8
Aunt and uncle	7
Father, mother and sister	6
Aunt and mother	6
Grandfather	6
Brother-in-law	5
Neighbor	5
Father, brother and sister	5
Wife and daughter	5
Mother-in-law	4
Son and daughter	4
Father, mother, sister and brother	4
Aunt and sister	4
Nephew	4
Grandmother and aunt	4
Half sister	3
Grandparents	2
Uncle and mother	2
Daughter-in-law	2
Mother and wife	1
Brother and husband	1
Brother and two nieces	1
Sister and husband	1
Mother and cousin	1
Husband and daughter-in-law	1
Sister and daughter	1
Patients	1
Sister, cousin and wife	1
Grandmother and uncle	1
Two sons and daughter	1
Second cousin	1
Father and grandfather	1
Sister, uncle, mother and aunt	1
Father, sister, wife and children	1
Father, mother and cousin	1
Ladies in hospital	1
Schoolmate	1
Father and wife	1
Mother and two brothers	1
Mother, sister and husband	1
Great aunt	1
Great grandfather	1
Stepdaughter	1
Sister and cousins	1
Grandchild	1
Father and son	1
Aunt and cousin	1
Mother and daughter	1
Uncle, mother and sister	1
Cousin and brother-in-law	1
Nephew and niece	1
Sisters, brothers and niece	1
Father, niece and brother	1
Three children	1
Sister and grandparents	1
Sons and son's wife	1
Father, uncle and sister	1
Niece and sister	1
Father, mother and brother	1
Brothers, sisters, son and daughter	1
Husband and four children	1
Great aunts	1
Half brother	1
Wife and son	1

Occupation of consumptives, reported in 5,470 instances.

Housewife	1,435
Farmer	832
Laborer	576
Housework	452
Housekeeping	408
Student	277
Clerk	116
School teacher	112
Milliner and dressmaker	86
Farmer's wife	81
Carpenter	55
Accountant	44
Painter	44
Baker	10
Sailor	10
Horse dealer	9
Soldier	9
Nurse	8
Fisherman	8
Cooper	7
Manufacturer	7
Photographer	6
Minister	6
Moulder	6
Lumberman	6
Hotel keeper	5
Veterinary surgeon	3
Driver	3
Electrician	3
Musician	3
Hostler	3
Gambler	2
Artist	2
Drayman	2
Candymaker	2
Lumber scaler	2
Brewer	2
Pensioner	2
Hairdresser	2

Occupation of consumptives, reported in 5,470 instances.—Concluded.

Merchant	43
Saloon keeper	40
Miner	39
Machinist	37
Farming	37
Railroad employé	36
Barber	29
Blacksmith	27
Printer	23
Teamster	23
Mason	22
Patients in insane asylum	21
Cigarmaker	21
Farmer's daughter	21
Factory hand	20
Engineer	19
Telegraphist	17
Tailor	17
Shoemaker	17
Cook	16
Woodman	14
Butcher	14
Commercial traveler	13
Druggist	13
Agent	13
Doctor	12
Grocer	10
Mill hand	10
Furniture dealer	10
Bootblack	1
Butler	1
Saddler	1
Street car conductor	1
Bricklayer	1
Bank teller	1
Tramp	1
Decorator	1
Laborer's wife	1
Plumber	1
Typewriter	1
Pattern maker	1
Boom man	5
Lumber dealer	5
Laundress	5
Weaver	5
Polisher	5
Peddler	5
Gardener	5
Stenographer	4
Seaman	4
Jeweler	4
Watchman	4
Marble cutter	4
Lawyer	4
Waiter	4
Fireman	4
Plasterer	4
Wagonmaker	4
Plumber	4
Cabinetmaker	4
Buttermaker	3
Miller	3
Janitor	3
Sister of Mercy	3
Millwright	3
Upholsterer	3
Mechanic	3
Designer	3
Lithographer	3
Drover	3
Civil engineer	1
Porter	1
Stereotyper	1
Builder	1
Professor	1
Showman	1
Ship tender	1
Cutter	1
Barn hand	1
Tobacco dealer	1
Cashier	1
Foreman	2
Boilermaker	2
Brickmaker	2
Hunter	2
Actor	2
Commissioner	2
Turner	2
Telephone manager	2
Liveryman	2
Station agent	2
Broker	2
Manager	2
Sawyer	2
Tradesman	2
Dealer in wool and hides	1
Saw filer	1
Hackman	1
Dentist	1
Fruit packer	1
Balloonist	1
Dealer in stock	1
Bicycle rider	1
Smelter	1
Surgeon	1
Errand boy	1
Brass worker	1
Surveyor	1
Contractor	1
Compositor	1
Canvasser	1
Milkman	1
Mail carrier	1
Reporter	1
Messenger	1
Carriage trimmer	1
Rag sorter	1
Brushmaker	1
Asylum attendant	1
Newsboy	1
Musician	1

The method of disinfection of sputa and soiled articles was mentioned in 2,532 instances, as follows:

Burned	1,406
Carbolic acid	212
Sulphur fumes	144
Burned and boiled	88
Boiled	73
Buried	71
Chloride of lime	65
Ashes	38
Disinfected	37
Burned and sulphur fumes	34
Formaldehyde	32
Platt's solution	29
Bichloride of mercury	27
Burned and carbolic acid	27
Boiled and fumigated	14
Burned and buried	13
Chloride solution	12
Bichloride of mercury and fire	10
Copperas	10
Burned and lime	10
Bichloride	10
Sulphur and boiling	9
Lime and carbolic acid	9
Boiled, burned and formaldehyde	8
Zinc	8
Burned, boiled or fumigated	7
Carbolic acid and sulphur fumes	7
Heating and sulphur fumes	6
Washing	6
Steamed	6
Boiling and zinc	5
Burned and formaldehyde	5
Chloride and sulphur	5
Carbolic acid and boiling	5
Boiled and bichloride solution	4
Burned, carbolic acid and sulphur	4
Steam and fire	4
Carbolic acid and lime	4
Ashes and lime	4
Chloride solution, sulphur and boiling	4
Creolin and boiling water	4
Carbolic acid, turpentine and sulphur	3
Sulphur and zinc	3
Burned and zinc solution	3
Buried and boiled	3
Disinfectant solution	3
Antiseptic solution	3
Boiled, burned and chloride of lime	2
Steam and carbolic acid	2
Bichloride of mercury, carbolic	2
Lime and burning	2
Washing and sulphur fumes	2
Fire and copperas	2
Corrosive sublimate	2
Formaldehyde and chloride	1
Sulphur, scrubbing and whitewashing	1
Chloride of lime and buried	1
Vapo-cresoline and buried	1
Chloride solution, boiled, chloride of lime and mercury	1
Zinc, boiling and sulphur	1
Fire, boiling and sulphur	1
Carbolic acid and Platt's chloride	1
Ashes and burned	1
Steam and chloride of lime	1
Steam and formaldehyde	1
Chloride of mercury and formaldehyde	1
Zinc and salt	1
Zinc, sulphur and salt	1
Bichloride and buried	1
Lime and boiling	1
Potash	1
Sulphur and formaldehyde	1
Lime and zinc	1
Sulphate of iron and burned	1
Burning and mercury	1
Antiseptic paper burned	1
Lye	1
Phenol	1

Bowel discharges were disposed of in 3,457 instances, as follows:

Buried	930
Vault	723
Privy	398
Sewer	250
Closet	202
Disinfected	189
Burned	176
Ground	127
Disinfection and buried	85
Carbolic acid	42
Lime	39
Disinfection and privy	35
Chloride	31
Ashes	27
Carried away	22
Buried and lime	18
Chloride of lime and buried	18
Scalded or boiled	16
Vault and lime	16
Bichloride of mercury	11
Privy and lime	11
Privy and ashes	10
Platt's solution	9
Copperas	8
Disinfected and burned	8
Destroyed	6
Bichloride and privy	6
Lime and ashes	5
Cesspool	5
Carbolic acid and vault	4
Privy and buried	3
Zinc solution	3
Bichloride and lime	3
Vault and copperas	3
Sulphate of iron	2
Disinfection and sewer	2
Calcium chloride	2
Copperas and buried	2
Bichloride of lime and mercury	2
Formalin	1
Thrown in creek	1
Vault and sulphur	1
Mercury and sewer	1
Carbolic acid	1
Carbolic acid, privy, and chloride of lime	1
Lime and sulphur	1
Manure heap	1

For the four years 1897-1900 the disease was stated to have begun in 3,669 instances with—

Cold	1,659
Influenza or la grippe	591
Bronchitis	421
Hemorrhage	292
Pneumonia	263
Cough	84
General debility	48
Typhoid fever	31
Measles	29
Pleurisy	27
Catarrh	26
Malarial fever	21
Asthma	15
Whooping-cough	14
Bowel trouble	13
Child birth	13
Congestion of lungs	8
Diarrhea	8
Ill from birth	7
Pain in side	6
Throat	6
Abscess	6
After miscarriage	5
Sciatica and rheumatism	5
Laryngitis	5
Anemia	4
Scrofula	3
Inflammation of kidney	3
Cold and dyspepsia	3
Marasmus	3
Tubercular glands	3
From a fall	2
Gangrene of lung	2
Suppressing of menses	2
Chills and fever	2
Fistula	2
Heart	2
Enlarged glands	2
Extreme nervousness	2
Lumbago	2
Congestion of liver	2
Joint	2
Scrofula and la grippe	1
Kidney and stomach	1
Stomach and heart	1
Hardening of lungs	1
In toe	1
Change of life	1
Catarrhal fever	1
Curvature of spine	1
Mesenteric glands	1
Shoulder joint	1
Softening of brain	1
Stomach	1
Gastric fever	1
Appendicitis	1
Headache and night sweats	1
Cholera infantum	1
Quinsy	1
Ulceration of rectum	1
Hip disease	1
Brain fever	1
Scarlet fever	1
La grippe and pleurisy	1
Chest	1
Hay fever	1

During the years, 1897-1900, of the 3,669 instances of consumption in which it was stated how the disease began, 80 per cent began as bad cold, influenza (la grippe), bronchitis, or pneumonia.

Nationalities of consumptives, reported in 5,374 instances.

American	3,281	Polish	50	Bohemian	6
German	610	Norwegian	21	Scandinavian	4
Canadian	317	Danish	16	Swiss	3
Irish	275	Caucasian	12	Welsh	3
English	173	Nova Scotian	10	Assyrian	2
Dutch	169	Austrian	9	Bavarian	2
French	147	Italian	9	Greek	1
Swedish	104	Belgian	7	Hungarian	1
Finnish	69	Russian	6	Australian	1
Scotch	66				

Information contained in final reports of cases of consumption during the years 1895-1900.—For the year 1895, 42 final reports of fatal cases of consumption in Michigan, were received at this office; for 1896 there were 137, for 1897 there were 457, for 1898, 1,872, for 1899, 1,920, and for 1900, 1,738 such final reports received relative to fatal cases of consumption. The information contained in these 6,166 reports, for the six years, is combined and summarized below.

Of the 8,862 consumptives of whom the sex was stated, 3,889 were males and 4,973 were females.

Of 8,285 consumptives of whom the color was stated, 8,060 were white, 143 black (negroes) and 82 red (indians).

The complexion of 4,189 consumptives was stated as: Black 21, dark 1,389, light 2,779.

Color of hair was stated in 4,910 instances as: Black 264, dark 2,159, brown 507, auburn 551, light 1,351, white or gray 78.

Of the civil condition of 6,099 consumptives 3,477 were reported as married, 2,421 single, and 201 as widows or widowers.

Of 3,921 replies given in the reports to the question, were sputa of consumptives bacteriologically examined, 2,908 were "no" and 1,013 "yes."

In answer to the question, were persons or animals infected from this patient, in 83 instances the reply was "yes." In 1898 twenty-seven persons and three animals, and in 1899 fifteen persons and three animals, and in 1900 twenty-seven persons, were reported to have taken the disease from consumptives.

Results of bacteriological examinations of sputa of alleged consumptives in Michigan, in 1898, 1899 and 1900.—As previously stated in this article 1,013 affirmative replies were given to the question, "Was the sputum of the patient bacteriologically examined for the bacillus tuberculosis?" Relative to the results of these examinations only 535 positive statements were made. In 500 instances bacilli tuberculosis were reported to have been found in the sputa. In thirty-five instances the result was reported negative, no bacilli having been found; thus showing that the results in about 93 per cent of the examinations were positive and in only about 7 per cent were negative.

Infection by direct contact or association.—Relative to a decedent from consumption in Bear Lake township, Manistee county, the health officer, in a final report, states:—

"Deceased nursed a case of consumption in company of one other."

The health officer of Osceola township, Houghton county, reporting relative to a case of consumption said:

"By living in the same house and inhalation of germs."

Relative to a death from consumption, in Unadilla township, Livingston county, the health officer reported:—

"Patient took music lessons of a consumptive."

Traverse City, Grand Traverse county, the health officer wrote to this office as follows:—

"There has been reported to me since February 21, 1900, nine cases of consumption, or tuberculosis, from the Northern Asylum, three on February 21; one died February 24, and five on February 26. Three taken January, 1900, and two in February. The others were taken March 1, August 15, September 20 and October 3, 1899. Every precaution is being taken to prevent spread. They are now going over the entire institution and examining for Baccilius."

From injury.—Relative to a death from consumption in Clinton village, Lenawee county, the health officer wrote to this office as follows:—

"The case of Charles Embler, died with tubercular condition of bones, not the lungs. He was injured two years ago and gradually fell in a state of cachexia; the osseous system was in a tubercular state."

Bethany township, Gratiot county, relative to a case of consumption, the health officer reported:—

"Caused by a fall from a fence which injured his limb."

Bad ventilation.—Relative to this case, the health officer of Iron River township, Iron county, in a final report, wrote:—

"Patient was formerly a miner and it is thought contracted the disease working in a badly ventilated mine."

Suspected infection from cow's milk.—Relative to this case, the health officer of Marion village, Osceola county, reported:—

"Thought to have been from cow's milk."

Inherited.—The health officer of Brookfield township, Eaton county, states in a final report:—

"Inherited from grandparents, parents, brother and sister."

December 30, 1900, George Pearn, M. D., of Newberry township, Cass county, wrote to this office as follows:—

"In a final report sent you I wish to add one important fact found out since E. P's sister died about four years ago from tubercular meningitis and E. helped nurse her. The fumigation was thorough. I am afraid others in the family will develop same disease, family history tuberculosis, on the mother's side, a sister of E. P's grandmother having died years ago in the east."

In answer to the question were the rooms occupied by consumptive patients disinfected, only nine hundred and fifteen instances were given for the year 1900 as follows:—

In 258 instances sulphur, three pounds or more per thousand cubic feet, used; in 430 instances sulphur, the amount not stated, or amount not enough; in 41 instances formaldehyde to the amount of eight ounces per thousand cubic feet or over was used, and in 85 instances formaldehyde was used but amount not enough, or amount not stated; in 25 instances sulphur and formaldehyde were both used, but amount not stated; in 70 instances the rooms were disinfected, whitewashed or cleaned; in 2 instances carbolic acid and eucalyptol lamp; in 2 instances juniper tree; in 1 instance acid, and in 1 instance wood alcohol.

PNEUMONIA IN MICHIGAN IN 1900.

During the year 1900, reports relative to sixty-eight cases, including thirty-nine deaths, from pneumonia were received at this office from twenty-nine localities in Michigan, as follows:

Standish township, Arenac county, five cases, five deaths; Niles, Berrien county, one case, one death; Bengal township, Clinton county, one case; Eaton Rapids, Eaton county, one case; Peninsula township, Grand Traverse county, one case, one death; Newark township, Gratiot county, one case; Litchfield township, Hillsdale county, one case; Kalamazoo city, Kalamazoo county, thirteen cases, seven deaths; Kalamazoo township, Kalamazoo county, one case; Ishpeming city, Marquette county, six cases, two deaths; Jasper township, Midland county, one case, one death; Mt. Haley township, Midland county, one case, one death; Stanton village, Montcalm county, twelve cases, four deaths; Dundee township, Monroe county, one case, one death; Dundee village, Monroe county, three cases, three deaths; Briley township, Montmorency county, one case; Bridgeton township, Newaygo county, one case, one death; Benona township, Oceana county, two cases, two deaths; Interior township, Ontonagon county, one case, one death; Cedar township, Osceola county, one case; Elk township, Sanilac county, one case, one death; Dayton township, Tuscola county, two cases, two deaths; Vassar township, Tuscola county, three cases, three deaths; Watertown township, Tuscola county, one case, one death; Arlington township, Van Buren county, one case, one death; Gobleville township, Van Buren county, one case; Pine Grove township, Van Buren county, one case; Manton village, Wexford county, two cases, one death; Trout Creek village, Ontonagon county, one case.

The above-mentioned are all the cases of pneumonia reported to this office during the year; but they constitute only a very small proportion of the whole amount of sickness from this disease in the State during this period. Reference to Table 1, page 63, of the article on " Sickness Statistics" in this report shows that of the 5,513 weekly card reports received at this office during the year, sixteen per cent state the presence of pneumonia under the observation of the reporter.* The Vital Statistics as finally compiled in the State Department, indicate that in the year 1900 pneumonia caused more deaths in Michigan than any other disease, except organic heart disease, and consumption (including tuberculosis without specification of its location). However, deaths from "typhoid pneumonia" have been included with the deaths from pneumonia. The office of the State Board of Health has knowledge of 52 deaths so reported. If deaths reported from "broncho-pneumonia" were also to be included with pneumonia, the total deaths would outnumber those from consumption, from which the deaths have been decreasing in recent years.

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* By the same table it may be seen that twenty-five per cent stated the presence of consumption, under the observation of the physicians reporting; the statements relative to the two diseases indicating that pneumonia caused thirty-six per cent less *sickness* than did consumption.

In preceding years when the State Department Bulletins have shown more deaths from pneumonia than from consumption, the final compilation has shown a less number from pneumonia, some deaths at first attributed to pneumonia having been found later to have been chargeable to some other disease, the pneumonia having been only the immediate cause, another having been the main disease.

DIPHTHERIA IN MICHIGAN.—YEAR ENDING DEC. 31, 1900.

COMPILED UNDER THE DIRECTION OF THE SECRETARY OF THE STATE BOARD OF HEALTH.

During the year ending December 31, 1900, there were reported to the Secretary of the State Board of Health, 493 outbreaks of diphtheria in 399 localities in Michigan, which resulted in 2,706 cases, including 528 deaths.

The average number of cases of sickness and deaths per outbreak were, cases 5.49; deaths 1.06. The fatality, i. e., the per cent of cases which proved fatal, was 19.5.

The decrease in diphtheria which began in 1898 and continued through 1899 is still apparent in 1900, with the exception of a slight increase in the number of reported cases and deaths in 1900 over those reported in 1899; there being 552 cases, including 93 deaths, more in 1900 than in 1899.

Antitoxin treatment of diphtheria.—The antitoxin treatment of diphtheria was commenced about 1894, but not until 1898 were the statements regarding its use reported in sufficiently definite form to enable this office to make a thorough or systematic study of its results.

In 1898, efforts were made to ascertain the results of this treatment, and determine its relation, if any, to the marked decrease in sickness and death from diphtheria which began in 1898. The beneficial effects of this treatment of diphtheria, and its relation to the proportionate decrease in the numbers of cases and deaths from the disease, seem to be substantiated by the statements of health officers and physicians who have made use of the agent in outbreaks of the disease, both as a curative and immunizing agent.

TABLE 1.—*Exhibiting the number of outbreaks, and the number of cases and deaths per outbreak from diphtheria, in 1900, in those outbreaks in which antitoxin was used, with the cases and deaths per outbreak where it was not used.*

	Outbreaks.	Cases.	Deaths.	Average cases per outbreak.	Average deaths per outbreak.
Antitoxin used	135	535	81	3.96	.6
Antitoxin not used	358	2,171	447	6.06	1.25
All outbreaks	493	2,706	528	5.49	1.07

In Table 1, comparing the average numbers of cases and deaths per outbreak, in the year 1900, it appears that there were 2.10 cases, including .65 of one death per outbreak less in those outbreaks in which antitoxin was used than in those outbreaks where it was not used.

In 1900, it was reported to this office that antitoxin had been used in 135 outbreaks of diphtheria, which resulted in 535 cases of sickness, including 81 deaths. The fatality (deaths per 100 cases), in these 135 outbreaks where the agent was used,was fifteen per cent; and in outbreaks where antitoxin was not used the fatality was 30.6 per cent.

In connection with the general study of the prevalence of diphtheria from year to year, an important fact is the perceptible decrease in the mortality-rate in the year of the introduction of antitoxin, 1894, this decrease being maintained through each succeeding year, up to and including 1900. While it is true that the number of reported *cases* was not diminished below the average year until 1898, this can be attributed, perhaps, to the fact that not until 1898 was antitoxin used as an immunizing agent, of those exposed to the disease, its use prior to that time being restricted largely to the cure of persons already sick with diphtheria.

TABLE 2.—*Exhibiting for the ten years, 1884-1893, the number of reported outbreaks, localities, cases and deaths; average number of cases and deaths per outbreak, and the per cent of cases which proved fatal (mortality rate) for each of the ten years, 1884-1893, before the use of antitoxin. Also a similar average for seven years, 1894-1900, since the use of antitoxin.*

Year.	Reported outbreaks.	Reported localities.	Reported cases.	Average cases per outbreak.	Reported deaths.	Average deaths per outbreak.	Deaths per 100 cases.
1884	362	302	3,915	10.8	905	2.5	23.
1885	467	396	4,018	8.6	964	2.0	24.
1886	550	422	4,244	7.7	982	1.8	23.
1887	466	371	3,382	7.3	825	1.8	24.4
1888	337	283	2,228	6.6	532	1.6	23.9
1889	398	329	3,157	7.9	683	1.7	21.6
1890	442	365	4,206	9.5	1,050	2.4	25.
1891	535	461	4,385	8.2	1,002	1.9	22.8
1892	527	463	4,818	9.1	1,099	2.1	22.8
1893	546	460	4,736	8.7	1,092	2.0	23.1
Average for 10 years, 1884-93	463	385	3,909	8.4	913	2.0	23.4
1894*	435	367	3,852	8.9	744	1.7	*19.3
1895	401	347	3,433	8.6	708	1.8	20.6
1896	423	331	4,013	9.5	757	1.8	18.9
1897	495	396	4,132	8.3	756	1.5	18.3
1898	439	354	2,357	5.4	477	1.1	20.2
1899	366	303	2,154	5.89	435	1.19	20.2
1900	493	399	2,706	5.49	528	1.07	19.5
Average for 7 years, 1894-1900	436	357	3,235	7.42	629	1.44	19.5
Departure of average for 7 years, 1894-1900, from average for 10 years, 1884-93	—27	—28	—674	—.98	—284	—.56	—3.9

* The use of antitoxin for diphtheria was commenced about this time.

Just what results have attended the use of antitoxin treatment of diphtheria in Michigan, and the relation it bears to the decrease in the last three years, cannot be shown entirely from reports of its use received at this office. However, a study of such statements shows not only that the number of deaths reported has been less, but also that the number of cases has been less in outbreaks where antitoxin has been used than in those outbreaks where it has not been used, that is to say, in many instances, the spread of the disease has been lessened where antitoxin has been used as an immunizing agent. The general results attending its use seem to make it an important factor in the decrease of the disease as well as in the decrease of the mortality-rate.

W. C. Marsh, M. D., health officer of Albion city, reported relative to an outbreak of diphtheria in his jurisdiction, in which antitoxin was used in the treatment of cases. He writes as follows of the beneficial results of said treatment:—

"Antitoxin is used in nearly every case, both in curative and immunizing doses. I know of only three of four cases where it has not been used and it is *very, very* rarely that we have the second case in the same family. The cases that have died have been those where it was used very late. I lost a case recently where the child was sent home from school Friday noon with a very sore throat, but I was not called till Monday noon. I administered 1500 units XX P. D. and Co. to the patient, and 500 units XX to five other children in the family. The patient died after an illness of nine days *but no other cases came down with the disease.*"

Relative to another part of this letter Dr. Baker, Secretary of the State Board of Health, wrote:—

"The writer of this letter supplies the facts which prove another reason [for the fact that sometimes the deaths are a larger proportion of the cases than formerly], namely, the use of antitoxin as an immunizing agent, so that whereas before that was done and in localities now where that is not done several of those exposed to the first case contracted diphtheria, now where this is done only the first (serious) case has the disease and that case not very infrequently proves fatal."

Further on, a diagram entitled "Isolation and Disinfection Restricted Diphtheria" illustrates the lessening of diphtheria by those means before and since the general use of antitoxin.

Distribution of diphtheria by counties in 1900.—Table 3 exhibits the reported diphtheria by counties during the year. Said table shows, in addition to the actual numbers of reported cases and deaths, the sickness and death-rates per 10,000 of population in each county; thus rendering the relative amount of sickness and death from this disease in the counties more readily conceivable.

Sickness-rates from diphtheria in 1900.—Table 3 shows the sickness-rate for the whole State during the year was 11.17 per 10,000 of population. By counties, the greatest sickness-rate (48.97) was in Ingham county; and the lowest (.48) was in Mecosta county. In thirteen counties there was no reported sickness from diphtheria.

Death-rates from diphtheria in 1900.—The death-rate for the State was 2.18 per 10,000 of population. The highest death-rate (9.7 per 10,000 of population), was in Presque Isle county; and the lowest where deaths occurred (.33 of one death per 10,000 of population), was in Gratiot county. In twenty counties there were no reported deaths from diphtheria.

The proportionate case-rate, death-rate and fatality or case mortality, in cities, villages, and townships.—The proportionate fatality, or "case mortality," from diphtheria in 1900, i. e., the proportion of reported cases which proved fatal, was, for the whole State, 19.5 per cent, or nearly one death to about five cases.

TABLE 3.—*Numbers of cases and deaths reported from diphtheria per 10,000 persons living in each county in Michigan during the year 1900. (Compiled from reports of health officers, clerks, etc.)*

Counties.	Population for 1900.	Number of reported		Number per 10,000 population, of	
		Cases.	Deaths.	Cases.	Deaths.
State	2,420,982	2,706	528	11.17	2.18
Alcona	5,691	0	0	0	0
Alger	5,868	2	1	3.41	1.70
Allegan	38,812	21	7	5.41	1.80
Alpena	18,254	22	11	12.05	6.03
Antrim	16,568	3	2	1.81	1.21
Arenac	9,821	14	4	14.26	4.07
Baraga	4,320	0	0	0	0
Barry	22,514	23	1	10.22	.44
Bay	62,378	150	36	24.05	5.77
Benzie	9,685	1	0	1.03	0
Berrien	49,165	33	16	6.71	3.25
Branch	27,811	10	0	3.60	0
Calhoun	49,315	121	10	24.54	2.03
Cass	20,876	11	4	5.27	1.92
Charlevoix	13,956	1	0	.72	0
Cheboygan	15,516	5	2	3.22	1.29
Chippewa	21,338	49	16	22.96	7.50
Clare	8,360	7	1	8.37	1.20
Clinton	25,136	5	2	1.99	.80
Crawford	2,943	0	0	0	0
Delta	23,881	37	11	15.49	4.61
Dickinson	17,890	14	6	7.83	3.35
Eaton	31,668	16	2	5.05	.63
Emmet	15,931	0	0	0	0
Genesee	41,804	13	6	3.11	1.44
Gladwin	6,564	1	0	1.52	0
Gogebic	16,738	12	4	7.17	2.39
Gd. Traverse	20,479	24	2	11.72	.98
Gratiot	29,889	3	1	1.0	.33
Hillsdale	29,865	0	0	0	0
Houghton	66,063	37	6	5.60	.91
Huron	34,162	38	6	11.12	1.76
Ingham	39,818	195	18	48.97	4.52
Ionia	34,329	12	3	3.20	.87
Iosco	10,246	4	3	3.90	2.93
Iron	8,990	17	2	18.91	2.22
Isabella	22,784	9	4	3.95	1.76
Jackson	48,222	18	4	3.73	.83
Kalamazoo	44,310	54	5	12.19	1.13
Kalkaska	7,133	0	0	0	0
Kent	129,714	178	35	13.65	2.62
Keweenaw	3,217	0	0	0	0
Lake	4,957	0	0	0	0
Lapeer	27,641	59	10	21.35	3.62
Leelanau	10,556	8	1	7.58	.95
Lenawee	48,406	24	2	4.96	.41
Livingston	19,664	5	0	2.54	0
Luce	2,983	0	0	0	0
Mackinac	7,703	3	0	3.89	0
Macomb	33,244	40	10	12.03	3.01
Manistee	27,856	19	6	6.82	2.15
Marquette	41,239	79	13	19.16	3.15
Mason	18,885	4	3	2.12	1.59
Mecosta	20,693	1	1	.48	.48
Menominee	27,046	11	3	4.07	1.11
Midland	14,439	22	2	14.54	1.39
Missaukee	9,308	14	7	15.04	7.52
Monroe	32,754	54	9	16.49	2.75
Montcalm	32,754	3	2	.92	.61
Montmorency	3,234	13	2	24.74	3.09
Muskegon	37,036	29	9	7.83	2.43
Newaygo	17,673	0	0	0	0
Oakland	44,792	26	7	5.80	1.56
Oceana	16,644	0	0	0	0
Ogemaw	7,765	4	3	5.15	3.86
Ontonagon	6,197	6	3	9.68	4.84
Osceola	17,859	3	3	1.68	1.68
Oscoda	1,468	0	0	0	0
Otsego	6,175	1	1	1.62	1.62
Ottawa	39,667	32	6	8.07	1.51
Presque Isle	8,821	24	8	27.21	9.07
Roscommon	1,787	0	0	0	0
Saginaw	81,222	103	27	12.68	3.32
Sanilac	35,055	105	17	29.95	4.85
Schoolcraft	7,889	6	4	7 61	5.07
Shiawassee	33,866	146	14	43.11	4.13
St. Clair	55,228	42	11	7.60	1.99
St. Joseph	23,889	3	0	1.26	0
Tuscola	35,890	62	10	17.28	2.79
Van Buren	33,274	23	5	6.91	1.50
Washtenaw	47,761	11	4	2.30	.84
Wayne	348,793	551	93	15.80	2.67
Wexford	16,845	10	1	5.94	.59

TABLE 4.—*Exhibiting the numbers of outbreaks and cases of and deaths from diphtheria which occurred in the cities, villages, and townships of Michigan in 1900, and the comparative numbers of outbreaks, cases, deaths, and fatality from this disease in cities, villages, and townships. (Compiled from reports of local health officials to the Secretary of the State Board of Health.)*

Classes of political divisions and numbers of each class of divisions.	Population.	Health jurisdictions.	Outbreaks in:			Cases.	Deaths.	Fatality. (Per cent deaths of cases.)	Rates per 10,000 population.	
			Localities.							
			No. of	Per cent of all localities.	No. of				Cases.	Deaths.
State (83 counties)	2,420,982	1,589	399	25	493	2,706	528	19	11.17	2.18
Cities	939,759	78	49	63	81	1,516	265	17	16.13	2.82
Villages	275,251	305	59	19	63	178	35	20	6.47	1.27
Townships	1,205,972	1,206	291	24	349	1,012	228	23	8.39	1.89

From the data in Table 4, it may be observed that 63 per cent of the cities, 19 per cent of the villages, and 24 per cent of the townships in the State were infected with diphtheria, but the average population of the cities is fourteen times the average of the villages. The lowest case-rate (6.47) and death-rate (1.27) occurred in the villages. The highest case-rate (16.13) and death-rate (2.82) occurred in the cities, the case-rate in cities being 2.5 times as great as in the villages and the death-rate more than twice as great. The highest fatality, 23 per cent, occurred in the townships and the lowest, 17 per cent, occurred in the cities.

TABLE 5.—*Exhibiting the number of outbreaks of diphtheria which were reported to have begun, to have ended, and the number which were present, in each month of the year 1900, in the different local jurisdictions of Michigan.*

Outbreaks.	Jan.	Feb.	Mar.	Apr.	May.	June.	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Outbreaks began	58	28	23	24	30	24	18	24	52	59	43	43	426
Outbreaks ended	38	46	33	20	32	27	25	16	25	47	51	66	426
Outbreaks present.	93	81	61	56	70	61	53	51	89	119	116	110	......

The last line of figures in Table 5, representing the reported number of outbreaks present, is not derived from the preceding two lines as might be supposed, but is obtained by actual count of the number of outbreaks reported as existing in each month. There may be a time during the outbreak when no cases are present, but if the subsequent cases can be attributed to infection from preceding ones, it is called one outbreak. Frequently the beginning of an outbreak is reported but the end of the outbreak is not reported, and sometimes the month in which the outbreak ended is given without giving the date of the beginning of the outbreak. In either case the outbreak may have begun and ended in the same month, or it may have extended through several months. There were the same number of outbreaks begun as ended in 1900.

TABLE 6.—*Exhibiting the number and per cent of localities from which the presence of diphtheria was reported, and the number and per cent of cases of diphtheria present in Michigan in each month during the year 1900. (Includes each case for which, the time during which it existed, was stated in the reports. Each of such cases is counted in each month in which, or part of which, the case was reported to have existed.)*

	Jan.	Feb.	Mar.	Apr.	May.	June.	July	Aug.	Sept.	Oct.	Nov.	Dec.
Localities, number.........	92	81	61	56	68	59	53	50	87	118	116	110
Per cent....................	23.2	20.4	15.4	14.1	17.1	14.9	13.4	12.5	21.9	29.7	29.2	27.7
Cases present, number.....	320	233	153	146	172	159	106	114	340	474	497	411
Per cent	11.8	8.6	5.7	5.4	6.4	5.9	3.9	4.2	12.6	17.5	18.4	15.2
Cases taken sick, number..	293	152	108	119	128	114	68	93	269	355	392	292
Per cent....................	10.8	5.6	4.0	4.4	4.7	4.2	2.5	3.4	9.9	13.1	14.5	10.8

The first line in Table 6, shows, for 1900, the number of localities in Michigan at which diphtheria was present in each month of the year. The second line shows the per cent those localities were of the total number of localities for the year.

Line three gives the number of cases sick in each month of the year and the fourth line gives the per cent the cases present by months were of all cases reported.

The fifth line of the table gives the number of cases taken sick each month, and the last line shows the per cent the cases taken sick in each month were of the total reported cases.

Source of contagium of diphtheria, and how the disease is spread.—Of the 2,706 cases of diphtheria reported during the year 1900, the local health officers reported the source of contagium as follows: Traced to a former case, 385; probably traced to a former case, 9; traced to cases of "sore throat," 45; due to infection from clothing, letters, papers, etc., 13; attributed to unsanitary conditions, 6; due to infection by animals, 3; contagium reported as from outside jurisdiction, 269; contagium reported as probably from outside jurisdiction, 38; unknown, or reports not definite (includes those reported "contagium," "sporadic," "spontaneous," etc.), 1,106; source not stated, 832; total, 2,706.

Cases of diphtheria traced to preceding cases of the disease.—As shown above, 385 of the 2,706 reported cases of diphtheria in Michigan in 1900, were traced to preceding cases of the disease. Had all first cases in the various jurisdictions been properly isolated, no doubt a large part of these 385 cases would have been prevented.

In 1900, as in previous years, the source of contagium of a number of cases were attributed to "unsanitary conditions." While such conditions may favor the spread of the disease and cause it to assume increased malignancy, the "germ," or contagious principle of the disease, must be present or the disease will not exist.

The contagium of diphtheria was reported by local officers to have spread from thirty-three first localities to fifty-four other (second) localities, resulting in fifty-four outbreaks, with an aggregate of two hundred and thirty-two cases, including thirty-three deaths; and from one of these second localities to one other (third) locality resulting in one outbreak, three cases and no deaths. Fourteen outbreaks with an aggregate of sixty cases, including eleven deaths, were traced to localities outside of Michigan. The source of contagium of nineteen outbreaks, with an aggregate of ninety-eight cases, including eighteen deaths, was reported as probably traced to outbreaks in other jurisdictions in Michigan; and three outbreaks with ten cases, including four deaths, as probably traced to outbreaks in localities outside the State.

Estimated number of cases of diphtheria prevented and lives saved by isolation and disinfection.—Tables 7 and 8 and diagram (Plate No. 1106) compare the average numbers of cases and deaths in outbreaks of diphtheria where the measures of isolation and disinfection, prescribed by the Michigan State Board of Health, were enforced, with the average numbers of cases and deaths in those outbreaks where these measures were neglected.* By Table 7 it may be seen that during the fourteen years, 1887-1900, there were over five times as many cases and deaths per outbreak in those outbreaks in which these measures were neglected as in those outbreaks in which they were enforced.

By Table 8 it may be seen that during the year 1900 there were reported to the office of the State Board of Health 460 outbreaks of diphtheria, with 1,595 cases, including 343 deaths. Had no efforts at restriction been made, and had the average numbers of cases and deaths per outbreak remained the same as in the column headed "Isolation and disinfection both neglected," there would have occurred 2,231 cases, including 423 deaths, and taking from these respectively the cases (1,595), including deaths (343) which did occur, leaves 636 cases, including 80 deaths, indicated as prevented in these 460 outbreaks, by isolation and disinfection. By the same method of computation for each year the indicated saving during the fourteen years, 1887-1900, is 36,882 cases, including 7,518 lives.

Definition of outbreak.—For studying the influence of isolation and disinfection in restricting outbreaks of communicable diseases, an outbreak is considered as the existence of one or more cases of a particular communicable disease within any health officer's jurisdiction, whether city, village, or township. All cases of the disease occurring within the jurisdiction during the outbreak are considered as part of the outbreak, unless the contagium cannot be traced to cases within the jurisdiction, and can be clearly traced to cases outside of the jurisdiction, in which instance they are considered as constituting a separate outbreak. When a period of over sixty days has elapsed since the last case (in a given jurisdiction) died or recovered, the outbreak is considered as ended,—unless new cases occur the contagium of which can be traced back to the preceding cases, in which instance the later cases are considered as part of the same outbreak. Possibly the sixty-day limit may at some future time be changed to ninety days; but in order to study the subject systematically, there must be a limit in time, as also in area. Also, comparisons of *years* require that outbreaks be counted as closed, at the end of the *year;* while in comparing *outbreaks* for testing the value of isolation and disinfection it is necessary to take *complete outbreaks,* even where they extend from one year into the next. This explains any apparent discrepancy between the numbers of outbreaks, cases and deaths here given and the numbers given at the beginning of this article.

Tables 7 and 8 and the diagram (Plate No. 1106) show in 1900, as compared with 1899, and also with the fourteen-year period, 1887-1900, a very considerable decrease in the number of outbreaks, in the cases per outbreak and in the deaths per outbreak.

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* In the compilation of the reports for Tables 7 and 8 and the diagram showing the results obtained by isolation and disinfection, every effort has been made to place the numbers of cases and deaths in each outbreak in the proper columns. If, for instance, there were only one or two cases in an outbreak and the health officer neglected to isolate and disinfect, but for some reason the disease spread no further, the number of cases and deaths were placed in the column headed "Isolation and disinfection both neglected." If, on the other hand, as often occurs, quite a number of persons are exposed at the same time and place outside the health officer's jurisdiction, and by proper isolation and disinfection he succeeds in confining the disease to the original cases exposed, they are placed in the column headed "Isolation and disinfection enforced." If, however, he neglects to properly isolate and disinfect, the whole number of these cases and deaths are placed in the "neglected" column. It is to be regretted that many of the reports received at this office do not state exactly what was done to restrict the disease, or are not sufficiently definite to enable the compilers to decide just what was done, and they are obliged to place all such in the column headed "Isolation or disinfection or both not mentioned, or statements doubtful."

TABLE 7.—DIPHTHERIA IN MICHIGAN, 1887-1900: *Exhibiting for the 14 years, and for each of the 14 years 1887-1900, the numbers of reported outbreaks, cases and deaths; also for this 14 year period, the average number of cases and deaths per outbreak in all outbreaks; in those outbreaks in which isolation or disinfection was doubtful; in which both isolation and disinfection were neglected; in which both isolation and disinfection were enforced; and also the numbers of cases and deaths indicated to have been prevented by isolation and disinfection.*

Years.	All outbreaks.*			Isolation and disinfection, or both, not mentioned, or statements doubtful.			Isolation and disinfection both neglected.			Isolation and disinfection both enforced.			Indicated saving of cases and lives by isolation and disinfection.	
	Outbreaks.	Cases.	Deaths.	Outbreaks.	Cases.	Deaths.	Outbreaks.	Cases.	Deaths.	Outbreaks.	Cases.	Deaths.	Cases.	Deaths.
1887	398	2,321	561	202	732	190	60	822	195	78	198	51	†3,132	†733
1888	311	1,529	324	199	810	189	34	527	81	58	101	31	3,292	416
1889	376	1,986	418	254	1,314	280	41	478	108	63	98	14	2,398	570
1890	439	2,713	619	291	1,649	401	71	902	169	46	70	15	2,862	426
1891	532	2,965	643	366	1,777	389	79	944	194	70	157	33	3,392	666
1892	525	3,485	740	323	2,341	456	52	657	147	49	105	24	3,146	746
1893	536	3,133	746	303	1,681	362	74	1,020	282	65	159	45	4,253	1,296
1894	420	2,262	404	202	986	174	56	738	122	81	176	37	3,274	512
1895	388	2,292	425	178	1,102	209	45	610	119	70	146	28	2,969	599
1896	405	2,460	432	153	925	165	64	794	142	69	164	27	2,566	467
1897	464	2,838	497	165	916	137	100	1,366	252	93	225	46	3,500	672
1898	399	1,535	308	127	516	114	79	539	103	77	149	28	1,186	211
1899	348	1,116	248	106	391	92	68	272	73	91	213	34	276	124
1900	460	1,595	343	148	571	150	92	446	85	99	169	30	636	80
Totals for the 14 years, 1887-1900	6,001	32,230	6,708	3,017	15,711	3,308	915	10,115	2,072	1,009	2,130	443	‡36,882 ‡34,081	‡7,518 ‡6,854
Average for the 14 years, 1887-1900	429	2,302	479	216	1,122	236	65	723	148	72	152	32	2,634	537
Average cases and deaths per outbreak for the 14 years, 1887-1900	....	5.37	1.12	....	5.20	1.09	....	11.12	2.28	....	2.11	0.44	....	......

* These do not include the cases and deaths in a number of the larger cities (foot-note to Table 8), because of the difficulty in determining the beginning and ending of an outbreak in those cities, in which the disease was present in some part of the city nearly all the year. † The numbers of cases and deaths in this double column are found by multiplying "All outbreaks" for each year by the average number of cases, or deaths per outbreak in those outbreaks in which "Isolation and disinfection both were neglected," for that year, and deducting from the result thus obtained, the cases or deaths, as the case may be, which were *reported* to have occurred that year. ‡ The two sets of numbers appearing in this column are based on two distinct methods of solution which are explained as follows: (1) the 36,882 cases and 7,518 deaths are totals of the columns representing cases and deaths saved as explained in the † foot-note; (2) the 34,081 cases and 6,854 deaths are obtained by multiplying the average numbers of cases and deaths per outbreak for the fourteen years, 1887-1900 (11.12 and 2.28 where isolation and disinfection were neglected), by the total number of outbreaks to find the numbers which would have occurred if all outbreaks had been neglected and subtracting therefrom the numbers of cases and deaths that were reported as having occurred during the fourteen-year period.

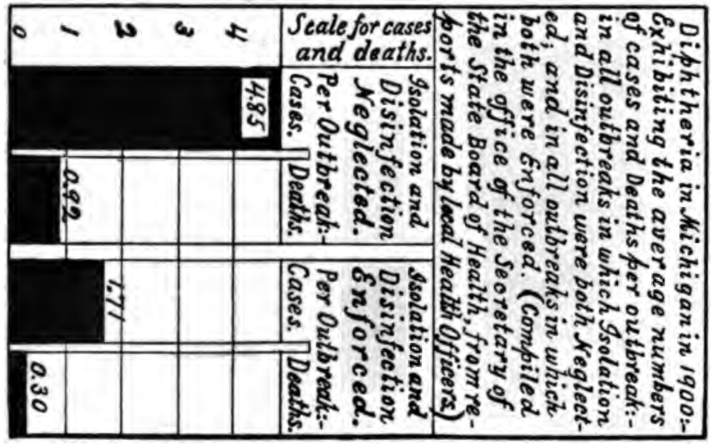
TABLE 8.—DIPHTHERIA IN MICHIGAN IN 1900: *Exhibiting the average numbers of cases and deaths per outbreak:—(1) in all the 460 outbreaks reported; (2) in the 148 outbreaks in which it is doubtful whether or not disinfection or isolation was enforced; (3) in the 8 outbreaks in which disinfection was enforced and isolation doubtful; (4) in the 44 outbreaks in which isolation was enforced and disinfection was doubtful; (5) in the 32 outbreaks in which disinfection was enforced and isolation neglected; (6) in the 37 outbreaks in which isolation was enforced and disinfection neglected; (7) in the 92 outbreaks in which isolation and disinfection were both neglected; (8) in the 99 outbreaks in which isolation and disinfection were both enforced.*

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)	
	All outbreaks.		Isolation or disinfection or both not mentioned, or sta'ements doubtful.		Disinfection enforced —isolation doubtful.		Isolation enforced — disinfection doubtful.		Disinfection enforced —isolation neglected.		Isolation enforced — disinfection neglected.		Isolation and disinfection both neglected.		Isolation and disinfection both enforced.	
	(460 outbreaks.*)		(148 outbreaks.)		(8 outbreaks.)		(44 outbreaks.)		(32 outbreaks.)		(37 outbreaks.)		(92 outbreaks.)		(99 outbreaks.)	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals....	1,595	343	571	150	32	8	138	21	174	30	68	19	446	85	169	30
Averages.	3.47	0.75	3.86	1.01	4.00	1.00	3.14	0.48	5.44	0.94	1.84	0.51	†4.85	†0.92	†1.71	†0.30

* These do not include the cases and deaths in Detroit, Grand Rapids, Kalamazoo, Bay City, West Bay City, Lansing and Owosso, because of the difficulty in determining the beginning and ending of an outbreak in these localities, in which the disease was present in some part of the locality nearly all the year.

† These figures are graphically represented in the diagram, Plate 1106, on this page.

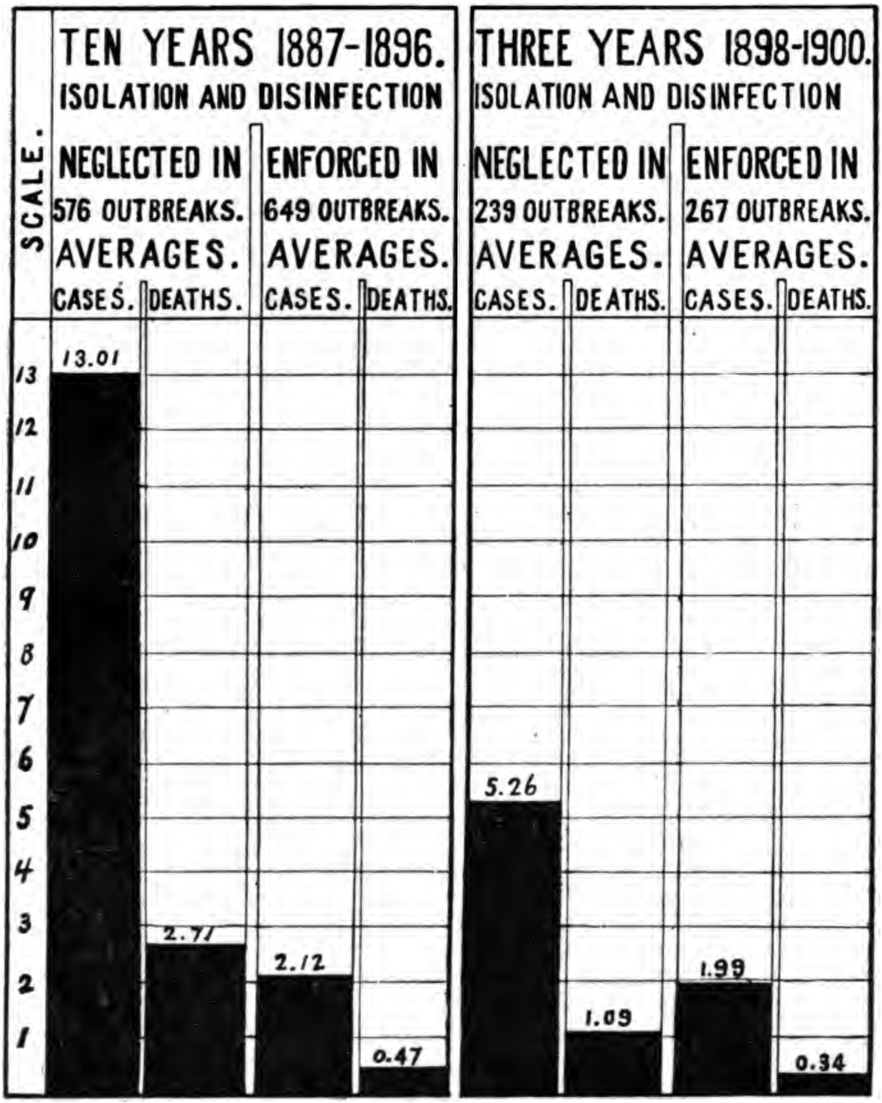
ISOLATION AND DISINFECTION RESTRICT DIPHTHERIA



[PLATE 1106]

The influence of the use of antitoxin on the numbers of cases and deaths per outbreak, is shown on a preceding page, the first few pages of this article. The accompanying diagrams (Plates 1106 and 1107) illustrate the lessening of diphtheria by isolation and disinfection in the year 1900, and in periods of years before and since the use of antitoxin.

Isolation and disinfection restricted diphtheria in Michigan during the ten years 1887-96,- __before__ the general use of antitoxin; also during the three years 1898-1900,- __since__ the use of antitoxin, during which three years there appears a great lessening of the cases of diphtheria.



[PLATE 1107]

TABLE 9.—*Exhibiting the reported period of incubation, stated in days, in 148 cases of diphtheria. Compiled from reports of health officers in Michigan, for the year 1900.*

Incubation period—days......	1	2	3	4	5	6	7	8	9	10	11	12	14	20	21	24
Cases in each period...........	3	17	18	*10	†14	‡8	§37	6	8	¶10	4	1	‖8	1	2	1

* In 2 of these cases *about* 4 days.
† In 4 of these cases *about* 5 days.
‡ In 3 of these cases *about* 6 days.
§ In 12 of these cases *about* 7 days.
¶ In 4 of these cases *about* 10 days.
‖ In 1 of these cases *about* 14 days.

The average period of incubation of diphtheria in the 148 cases is 6.6 days.

TABLE 10.—*Exhibiting in certain age-groups, the numbers of cases and deaths from diphtheria, the per cent that the cases in each group were of all cases of known ages; the per cent that the deaths in each group were of all deaths at known ages; and the per cent that the deaths in each group were of the cases in that group.—Compiled from all reports for the year 1900, which stated the ages.*

	Number and per cent of cases and deaths in certain age-groups.																
Ages in groups of years	All known ages.	0-1.	1-2.	2-3.	3-4.	4-5.	Under 5.	5-9.	10-14.	15-19.	20-24.	25-29.	30-34.	35-39.	40-44.	45-49.	50 and over.
No. of cases............	*2,103	42	96	115	157	163	573	677	356	173	118	85	50	23	26	10	12
Per cent the cases in each group were of all cases of known ages..	100	2	4.6	5.5	7.5	7.8	27.2	32.2	16.9	8.2	5.6	4.0	2.4	1.1	1.2	.5	.6
No. of deaths...........	500	33	54	47	60	49	243	161	61	19	6	2	1	0	3	2	2
Per cent the deaths in each group were of all cases in that group...	23.8	78.5	56.3	40	38.2	30.1	42.4	23.8	17.1	11	5.1	2.4	2	0	11.5	20	16.7
Per cent the deaths in each group were of deaths, known ages..	100	6.6	10.8	9.4	12	9.8	48.6	32.2	12.2	3.8	1.2	0.4	0.2	0	0.6	0.4	0.4
Per cent the deaths in special groups were of all deaths, known ages	....	48.6					80.8		17.2			2					

* Does not include those cases or deaths where the age was not stated.

TABLE 11.—*Exhibiting in certain age-groups, the numbers of cases and deaths from diphtheria in the year 1900; the per cent that the cases in each group were of all cases; the per cent that the deaths in each group were of all deaths, also totals for the 8 years, 1892-99.—Compiled from all reports for the years 1892-1900, which stated the ages.*

Year.		Total No. included.	Per cent of cases and deaths in certain age-groups.											
			All ages.	Under 5.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 years and over.
1900.	Cases..........	2,103	100	27.2	32.2	16.9	8.2	5.6	4.0	2.4	1.1	1.2	0.5	0.6
	Deaths.........	500	100	48.6	32.2	12.2	3.8	1.2	0.4	0.2	0	0.6	0.4	0.4
1892-99.	Cases..........	18,067	100	25.8	32.7	18.7	8.4	4.6	3.3	2.6	1.7	.9	.6	.6
	Deaths.........	3,904	100	43.6	33.5	13.5	4.4	1.9	1.2	.8	.4	.2	.2	.3

Of the 18,067 persons sick with diphtheria in the State during the eight years, 1892-99, the ages of whom were reported to this office, the largest percentage were of ages ranging from five to nine years; and seventy-seven per cent of the whole number were of ages under fourteen years.

Of the 3,904 deaths reported to have occurred during the same period the greatest percentage were of ages under five years and ninety-one per cent died at ages under fourteen years.

TABLE 12.—*Exhibiting, by sex, the per cent of persons in certain age-groups who recovered from diphtheria, in Michigan in 1900, and during the 7 years 1893-99, also the average age and the number of cases included. (Compiled from such reports as stated the ages.)*

Year.	Sex.	Average age of non-fatal cases, years.	No. of cases included.	Age.—In periods of years. Per cent of (non-fatal) cases in each period of age.											
				All ages.	Under five years.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 years and over.
1900.	Males.....	10.7	747	100	22.2	36.9	17.0	9.4	5.8	4.3	1.6	1.1	1.1	.54	0.13
	Females..	13.3	856	100	19.2	28	19.6	9.8	8.1	6.0	4.3	1.8	1.8	.47	1.1
1893-99.	Males.....	10.7	5,925	100	22.7	35	20.9	8.9	4.2	2.8	2.2	1.5	0.9	0.5	0.5
	Females..	13.3	7,084	100	16.6	30.7	21.4	10.2	6.4	4.5	3.8	2.8	1.6	.7	1.2

Table 12 shows for 1900 that the average age of non-fatal cases of diphtheria was, for males, 10.7 years, and for females 13.3 years; and that for the seven years, 1893-99, the average age of males was 10.7 and for females 13.3 years. Also that for both the year 1900 and for the period of years 1893-99, the greatest per cent of cases occurred at ages ranging from five to nine years.

TABLE 13.—*Exhibiting, by sex and in certain age-groups, the per cent of persons who died from diphtheria in Michigan in 1900 and during the 7 years 1893-99; also the average age at death, and the number of deaths included. (Compiled from such reports as stated the ages.)*

Deaths from diphtheria.												
Year.	Sex.	Average age, years.	No. of deaths included.	Ages.—In periods of years. Per cent of deaths in each period of age.								
				All ages.	Under 5.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 years and over.
1900.	Males	5.4	247	100	53.4	32	10.1	2.4	1.21	0	0.80
	Females	7.15	253	100	43.9	32.4	14.2	5.1	1.2	0.8	2.4
1893-99.	Males	7.1	1,595	100	43.8	35.1	12.7	4.8	1.7	.6	1.3
	Females	7.9	1,833	100	39.1	34.4	15.4	4.5	1.9	2.0	2.7

Table 13 shows for 1900 that the average age of decedents from diphtheria was, for males 5.4 years, and for females 7.15 years; and for the seven years 1893-99 that the average age of decedents from diphtheria was, for males 7.1 years and for females 7.9 years. Also that the greatest per cent of decedents, both in 1900 and in the period 1893-99, were of ages under five years.

Average duration of diphtheria.—Fatal and non-fatal cases.—In 1900 the average duration of fatal cases of diphtheria was, for males, 6.1 days, for females 6.1 days, and for both sexes 6.1 days.

TABLE 14.—*Exhibiting, by sex of patient, the duration (in days) of fatal cases of sickness from diphtheria, in Michigan, during the year 1900, and in the 7 years 1893-99. Per cent of deaths arranged in five-day groups. (Compiled from those reports which stated the length of time the patient was sick.)*

Fatal cases of diphtheria.											
Year.	Sex.	No. of cases included.	Duration of sickness:—Per cent of deaths in each period of days.								
			All cases.	1 to 5 days.	6 to 10.	11 to 15.	16 to 20.	21 to 25.	26 to 30.	31 to 35.	36 and over.
1900.	Males	160	100	61	22	10	4	1	0	1	0.6
	Females	155	100	65	19	8	3	3	0.6	0	2
1893-99.	Males	1,024	100	50	30	12	5	1	.5	.6	1
	Females	1,199	100	50	29	12	5	2	.8	.5	.6

In 1900 the average duration of fatal cases of diphtheria was for males 6.09 days, for females 6.1 days, and for both sexes 6.1 days.

TABLE 15.—*Exhibiting, by sex of patient, the duration (in days) of non-fatal cases of sickness from diphtheria, in Michigan, during 1900 and the 7 years 1893-99. Per cent of non-fatal cases arranged in five-day groups. (Compiled from those reports which stated the length of time the patient was sick.)*

Non-fatal cases of diphtheria.												
Year.	Sex.	No. of cases included.	Duration of sickness:—Per cent of non-fatal cases in each period of days.									
			All periods.	1 to 5.	6 to 10.	11 to 15.	16 to 20.	21 to 25.	26 to 30.	31 to 35.	36 days and over.
1900.	Males	604	100	14	35	19	11	11	4	1	5
	Females	746	100	16	29	21	11	11	5	3	5
1893-99.	Males	3,668	100	11	34	24	13	10	4	2	2
	Females	4,377	100	11	35	24	14	9	4	1	2

In 1900 the average duration of non-fatal cases of diphtheria was, in males, 13.6 days, in females 14.4 days, and in both sexes 14 days.

TABLE 9.—*Exhibiting the reported period of incubation, stated in days, in 148 cases of diphtheria. Compiled from reports of health officers in Michigan, for the year 1900.*

Incubation period—days......	1	2	3	4	5	6	7	8	9	10	11	12	14	20	21	24
Cases in each period...........	3	17	18	*10	†14	‡8	§37	6	8	¶10	4	1	‖8	1	2	1

* In 2 of these cases *about* 4 days.
† In 4 of these cases *about* 5 days.
‡ In 3 of these cases *about* 6 days.
§ In 12 of these cases *about* 7 days.
¶ In 4 of these cases *about* 10 days.
‖ In 1 of these cases *about* 14 days.

The average period of incubation of diphtheria in the 148 cases is 6.6 days.

TABLE 10.—*Exhibiting in certain age-groups, the numbers of cases and deaths from diphtheria, the per cent that the cases in each group were of all cases of known ages; the per cent that the deaths in each group were of all deaths at known ages; and the per cent that the deaths in each group were of the cases in that group.—Compiled from all reports for the year 1900, which stated the ages.*

	Number and per cent of cases and deaths in certain age-groups.																
Ages in groups of years	All known ages.	0-1.	1-2.	2-3.	3-4.	4-5.	Under 5.	5-9.	10-14.	15-19.	20-24.	25-29.	30-34.	35-39.	40-44.	45-49.	50 and over.
No. of cases............	*2,103	42	96	115	157	163	573	677	356	173	118	85	50	23	26	10	12
Per cent the cases in each group were of all cases of known ages..	100	2	4.6	5.5	7.5	7.8	27.2	32.2	16.9	8.2	5.6	4.0	2.4	1.1	1.2	.5	.6
No. of deaths...........	500	33	54	47	60	49	243	161	61	19	6	2	1	0	3	2	2
Per cent the deaths in each group were of all cases in that group...	23.8	78.5	56.3	40	38.2	30.1	42.4	23.8	17.1	11	5.1	2.4	2	0	11.5	20	16.7
Per cent the deaths in each group were of deaths, known ages..	100	6.6	10.8	9.4	12	9.8	48.6	32.2	12.2	3.8	1.2	0.4	0.2	0	0.6	0.4	0.4
Per cent the deaths in special groups were of all deaths, known ages	....	48.6					80.8		17.2			2					

* Does not include those cases or deaths where the age was not stated.

TABLE 11.—*Exhibiting in certain age-groups, the numbers of cases and deaths from diphtheria in the year 1900; the per cent that the cases in each group were of all cases; the per cent that the deaths in each group were of all deaths, also totals for the 8 years, 1892-99.—Compiled from all reports for the years 1892-1900, which stated the ages.*

Year.		Total No. included.	Per cent of cases and deaths in certain age-groups.											
			All ages.	Under 5.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 years and over.
1900.	Cases..........	2,103	100	27.2	32.2	16.9	8.2	5.6	4.0	2.4	1.1	1.2	0.5	0.6
	Deaths.........	500	100	48.6	32.2	12.2	3.8	1.2	0.4	0.2	0	0.6	0.4	0.4
1892-99.	Cases..........	18,067	100	25.8	32.7	18.7	8.4	4.6	3.3	2.6	1.7	.9	.6	.6
	Deaths.........	3,904	100	43.6	33.5	13.5	4.4	1.9	1.2	.8	.4	.2	.2	.3

Of the 18,067 persons sick with diphtheria in the State during the eight years, 1892-99, the ages of whom were reported to this office, the largest percentage were of ages ranging from five to nine years; and seventy-seven per cent of the whole number were of ages under fourteen years.

Of the 3,904 deaths reported to have occurred during the same period the greatest percentage were of ages under five years and ninety-one per cent died at ages under fourteen years.

TABLE 12.—*Exhibiting, by sex, the per cent of persons in certain age-groups who recovered from diphtheria, in Michigan in 1900, and during the 7 years 1893-99, also the average age and the number of cases included. (Compiled from such reports as stated the ages.)*

Year.	Sex.	Average age of non-fatal cases, years.	No. of cases included.	Age.—In periods of years. Per cent of (non-fatal) cases in each period of age.											
				All ages.	Under five years.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 years and over.
1900.	Males.....	10.7	747	100	22.2	36.9	17.0	9.4	5.8	4.3	1.6	1.1	1.1	.54	0.13
	Females..	13.3	856	100	19.2	28	19.6	9.8	8.1	6.0	4.3	1.8	1.8	.47	1.1
1893-99.	Males.....	10.7	5,925	100	22.7	35	20.9	8.9	4.2	2.8	2.2	1.5	0.9	0.5	0.5
	Females..	13.3	7,084	100	16.6	30.7	21.4	10.2	6.4	4.5	3.8	2.8	1.6	.7	1.2

Table 12 shows for 1900 that the average age of non-fatal cases of diphtheria was, for males, 10.7 years, and for females 13.3 years; and that for the seven years, 1893-99, the average age of males was 10.7 and for females 13.3 years. Also that for both the year 1900 and for the period of years 1893-99, the greatest per cent of cases occurred at ages ranging from five to nine years.

TABLE 13.—*Exhibiting, by sex and in certain age-groups, the per cent of persons who died from diphtheria in Michigan in 1900 and during the 7 years 1893-99; also the average age at death, and the number of deaths included. (Compiled from such reports as stated the ages.)*

Deaths from diphtheria.											
Year.	Sex.	Average age, years.	No. of deaths included.	Ages.—In periods of years. Per cent of deaths in each period of age.							
				All ages.	Under 5.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 years and over.
1900.	Males.............	5.4	247	100	53.4	32	10.1	2.4	1.21	0	0.80
	Females..........	7.15	253	100	43.9	32.4	14.2	5.1	1.2	0.8	2.4
1893–99.	Males.............	7.1	1,595	100	43.8	35.1	12.7	4.8	1.7	.6	1.3
	Females..........	7.9	1,833	100	39.1	34.4	15.4	4.5	1.9	2.0	2.7

Table 13 shows for 1900 that the average age of decedents from diphtheria was, for males 5.4 years, and for females 7.15 years; and for the seven years 1893-99 that the average age of decedents from diphtheria was, for males 7.1 years and for females 7.9 years. Also that the greatest per cent of decedents, both in 1900 and in the period 1893-99, were of ages under five years.

Average duration of diphtheria.—Fatal and non-fatal cases.—In 1900 the average duration of fatal cases of diphtheria was, for males, 6.1 days, for females 6.1 days, and for both sexes 6.1 days.

TABLE 14.—*Exhibiting, by sex of patient, the duration (in days) of fatal cases of sickness from diphtheria, in Michigan, during the year 1900, and in the 7 years 1893-99. Per cent of deaths arranged in five-day groups. (Compiled from those reports which stated the length of time the patient was sick.)*

Fatal cases of diphtheria.											
Year.	Sex.	No. of cases included.	Duration of sickness:—Per cent of deaths in each period of days.								
			All cases.	1 to 5 days.	6 to 10.	11 to 15.	16 to 20.	21 to 25.	26 to 30.	31 to 35.	36 and over.
1900.	Males.............	160	100	61	22	10	4	1	0	1	0.6
	Females..........	155	100	65	19	8	3	3	0.6	0	2
1893-99.	Males.............	1,024	100	50	30	12	5	1	.5	.6	1
	Females..........	1,199	100	50	29	12	5	2	.8	.5	.6

In 1900 the average duration of fatal cases of diphtheria was for males 6.09 days, for females 6.1 days, and for both sexes 6.1 days.

TABLE 15.—*Exhibiting, by sex of patient, the duration (in days) of non-fatal cases of sickness from diphtheria, in Michigan, during 1900 and the 7 years 1893-99. Per cent of non-fatal cases arranged in five-day groups. (Compiled from those reports which stated the length of time the patient was sick.)*

Non-fatal cases of diphtheria.											
Year.	Sex.	No. of cases included.	Duration of sickness:—Per cent of non-fatal cases in each period of days.								
			All periods.	1 to 5.	6 to 10.	11 to 15.	16 to 20.	21 to 25.	26 to 30.	31 to 35.	36 days and over.
1900.	Males	604	100	14	35	19	11	11	4	1	5
	Females	746	100	16	29	21	11	11	5	3	5
1893-99.	Males	3,668	100	11	34	24	13	10	4	2	2
	Females	4,377	100	11	35	24	14	9	4	1	2

In 1900 the average duration of non-fatal cases of diphtheria was, in males, 13.6 days, in females 14.4 days, and in both sexes 14 days.

TYPHOID FEVER IN MICHIGAN.—DURING THE YEAR ENDING DECEMBER 31, 1900.

During the year ending December 31, 1900, there were reported to the Secretary of the State Board of Health 1,113 outbreaks of typhoid fever (includes "typho-malarial" fever, but not "typhoid pneumonia") in 859 localities in Michigan, in which there were reported to have occurred 5,122 cases, including 920 deaths. Fifty-two deaths from typhoid pneumonia are not included. Perhaps they should have been; but in the vital statistics division of the State Department they were included with the deaths from pneumonia.

Notwithstanding the marked improvement secured both in promptness and in accuracy of reports of local health officials to the central office, not all cases of sickness from typhoid fever are yet reported. Such reports cannot be made by local health officers until the people generally fully understand the need of reporting every case of sickness from this "disease dangerous to the public health," for such typhoid fever really is.

Not even all the deaths are reported directly to the office of the Secretary of the State Board of Health by local health officers.

The Vital Statistics Division of the State Department reports to the State Board of Health each month the deaths from dangerous communicable diseases including typhoid fever, typho-malarial fever and typhoid pneumonia; therefore, a considerable proportion of the deaths shown to have been reported to the State Board of Health were first reported to the State Department. It is believed that nearly all deaths that occur are now, under the new law, reported to the Secretary of State; and of these about two-thirds of all the deaths, reported to the Secretary of State, are found to have been previously reported to the Secretary of the State Board of Health, nearly all of them promptly as the cases of sickness have occurred. And the proportion of the deaths found to have been reported as cases of sickness is constantly increasing.

Definition of the term "outbreak" as used in this article.—For studying the influence of isolation and disinfection in restricting outbreaks of communicable diseases, an outbreak is considered as the existence of one or more cases of a particular communicable disease within any health officer's jurisdiction, whether city, village or township. All cases of the disease occurring within the jurisdiction during the outbreak are considered as part of the outbreak, unless the contagium cannot be traced to cases within the jurisdiction, and can be clearly traced to cases outside of the jurisdiction, in which instance they are considered as constituting a separate outbreak. When a period of over sixty days has elapsed since the last case (in a given jurisdiction) died or recovered, the outbreak is considered as ended,—unless new cases occur the contagium of which can be traced back to the preceding cases, in which instance the latter cases are considered as part of the same outbreak. Possibly the sixty day limit may, at some future time, be changed to ninety days; but in order to study the subject systematically, there must be a limit in time, as also in area.

TYPHOID FEVER IN 1900 COMPARED WITH PREVIOUS YEARS.

Comparisons with previous years, to ascertain the comparative increase or decrease of the prevalence of typhoid fever in this State, are interesting and instructive, and they would be more so if there existed a fixed basis on which to found such comparisons. From year to year there has been a steady improvement, both in the methods adopted by the State Board of Health in securing and compiling reports, and in the efforts made by the local health officials throughout the State to furnish in their reports the information desired by the State Board. It is, however, still impossible to determine the exact increase or decrease of prevalence of the disease in this State by comparisons of the numbers of outbreaks of the disease, and the cases reported to this office year by year. But by means of the statistics of *deaths* it will soon be possible to make comparisons one year with another; because under the new law nearly all the deaths are returned to the Secretary of State, and by using the statistics of those in connection with the statistics of the office of the State Board of Health, a basis of comparison of the years will soon be possible. Some of the difficulties in the way of the immediate accomplishment of this are the different methods of compiling in the two offices; thus, for instance, a few deaths considered by the office of the State Board of Health as from typhoid fever were *probably* compiled in the State Department as from pneumonia, the returns reading "typhoid pneumonia."

A COMPARISON OF DEATHS FROM TYPHOID FEVER IN MICHIGAN DURING THE YEAR 1900, REPORTED TO THE OFFICE OF THE STATE BOARD OF HEALTH, WITH THOSE REPORTED TO THE DIVISION OF VITAL STATISTICS, IN THE STATE DEPARTMENT.

Reported to the State Board of Health.

Deaths from typhoid fever and typho-malarial fever in 1900 (also includes those deaths reported first to the Secretary of State)..		920
Reported to the State Department, Division of Vital Statistics.		
Deaths from typhoid fever in 1900......................	824	
Deaths from typho-malarial fever in 1900................	45	869
		51

Of the fifty-one deaths reported directly (and indirectly by the State Department) to the Secretary of the State Board of Health more than to the State Department Division of Vital Statistics, seventeen occurred in "non-registration districts,"—not required to report deaths until after the close of the year.

The facts exhibited in Table 1, show that the reported outbreaks, cases of sickness, and deaths from typhoid fever in 1900, exceeded the averages for the fourteen years, 1886-99; also that the numbers of deaths per 100 cases, and the final reports received relative to typhoid fever were more; but it is encouraging to note that the cases and deaths per outbreak were less in 1900 than the averages for the preceding years, indicating that the efforts for the restriction of this disease are having their proper effect.

TABLE 1.—TYPHOID FEVER.—*Exhibiting the numbers of outbreaks, localities, cases and deaths reported for the year 1900; also for the years 1886-99 the average reported outbreaks, localities, cases and deaths, and the average cases and deaths per outbreak, the deaths per 100 cases, and the number of special final reports received.*

Year.	Outbreaks reported.	Localities reported.	Cases reported.	Deaths reported.	Average cases per outbreak.	Average deaths per outbreak.	Deaths per 100 cases.	Final reports receiv'd.
1900.......	1,113	859	5,122	920	4.60	.83	18	910
Averages 1886-99...	543	477	2,742	478	5.05	.88	17	285

Sickness-rates from reported typhoid fever in 1900.—The reporting of cases of sickness from typhoid fever is not yet as complete as the reporting of deaths from that disease, therefore any comparisons made should be subject to the mental reservation that not all cases are reported, and that it is probable that the omissions are greater in some parts of the State than in others.

Table 2 shows that the sickness-rate from reported typhoid fever for the State in 1900 was 21.16 cases per 10,000 of population. The county having the greatest reported sickness-rate (200.11) per 10,000 inhabitants, was Chippewa; and the lowest (where sickness occurred) was in Leelanau county, where the rate was .95 of one case per 10,000 of population.

Death-rates from reported typhoid fever in 1900.—The death-rates are now believed to be fairly accurate. Table 2 shows that the death-rate from reported typhoid fever in 1900, for the State, was 3.80 per 10,000 of population. The county having the highest death-rate (34.01) was Presque Isle, and that having the lowest (where deaths occurred), .95 of one death per 10,000 of population, was Leelanau.

Typhoid fever in each month of the year 1900.—The last line in Table 3 shows the number of outbreaks present in each month of the year. As many outbreaks lasted more than one month they are counted in each month of their duration; consequently the sum of the outbreaks present in the several months exceeds the total number of reported outbreaks.

TABLE 2.—*Numbers of cases and deaths reported from typhoid fever, and the cases and deaths per 10,000 persons living in each county in Michigan during the year 1900. (Compiled from reports of health officers, etc.)*

State and counties.	Population of Michigan for 1900.	Number of reported		Number per 10,000 population, of		Counties.	Population of Michigan for 1900.	Number of reported		Number per 10,000 population, of	
		Cases.	Deaths.	Cases.	Deaths.			Cases.	Deaths.	Cases.	Deaths.
State	2,420,982	5,122	920	21.16	3.80	Keweenaw....	3,217	0	0	0	0
						Lake..........	4,957	23	5	46.40	10.09
Alcona	5,691	6	2	10.54	3.51	Lapeer........	27,641	53	4	19.17	1.45
Alger.........	5,868	4	1	6.82	1.70	Leelanau.....	10,556	1	1	.95	.95
Allegan	38,812	41	7	10.56	1.80	Lenawee... ..	48,406	125	24	25.82	4.96
Alpena	18,254	22	10	12.05	5.48	Livingston...	19,664	58	2	29.50	1.02
Antrim	16,568	33	10	19.92	6.04	Luce	2,983	4	4	1.34	1.34
Arenac	9,821	10	1	10.18	1.02	Mackinac	7,703	1	0	1.21	0
Baraga..	4,320	7	1	16.20	2.31	Macomb	33,244	223	30	67.08	9.02
Barry	22,514	37	4	16.43	1.78	Manistee	27,856	42	12	15.08	4.31
Bay	62,378	135	23	21.64	3.69	Marquette ...	41,239	121	22	29.34	5.33
Benzie........	9,685	23	4	23.75	4.13	Mason........	18,885	51	16	27.01	8.47
Berrien.......	49,165	52	17	10.58	3.46	Mecosta......	20,693	46	12	22.23	5.80
Branch	27,811	45	9	16.18	3.24	Menominee...	27,046	17	11	6.29	4.07
Calhoun......	49,315	85	18	17.24	3.65	Midland......	14,439	29	7	20.08	4.85
Cass..........	20,876	31	5	14.85	2.40	Missaukee....	9,308	69	9	74.13	9.67
Charlevoix...	13,956	43	8	30.81	5.73	Monroe.......	32,754	70	15	21.37	4.58
Cheboygan...	15,516	30	4	19.33	2.58	Montcalm....	32.754	33	9	10.08	2.75
Chippewa ...	21,338	427	16	200.11	7.50	Moutmorency	3,234	6	1	18.55	3.09
Clare	8,360	17	5	20.33	5.98	Muskegon	37,036	36	12	9.72	3.24
Clinton	25,136	91	11	36.20	4.38	Newaygo	17,673	50	13	28.29	7.36
Crawfod.......	2,943	7	1	23.79	3.40	Oakland......	44,792	61	10	13.62	2.23
Delta.........	23,881	85	14	35.59	5.86	Oceana	16,644	33	7	19.83	4.21
Dickinson....	17,890	6	0	3.35	0	Ogemaw	7,765	25	2	32.20	2.58
Eaton	31,668	114	12	36.00	3.79	Ontonagon...	6,197	16	2	26.82	3.23
Emmet.......	15,931	36	5	22.60	3.14	Osceola.......	17,859	33	7	18.48	3.92
Genesee......	41,804	32	8	7.65	1.91	Oscoda	1,468	13	0	88.56	0
Gladwin......	6,564	16	2	24.38	3.05	Otsego........	6,175	35	6	56.68	9.72
Gogebic......	16,738	59	13	35.25	7.77	Ottawa........	39,667	29	11	7.32	2.77
Gd. Traverse.	20,479	57	9	27.83	4.39	Presque Isle.	8,821	51	3	57.82	34.01
Gratiot.......	29,889	83	15	27.77	5.02	Roscommon..	1,787	1	0	5.60	5.60
Hillsdale	29,865	50	7	16.74	2.34	Saginaw......	81,222	98	28	12.07	3.45
Houghton...	66,063	62	22	9.38	3.33	Sanilac	35,055	96	15	27.10	4.28
Huron........	34,162	66	15	19.32	4.40	Schoolcraft .	7,889	10	4	12.68	5.07
Ingham	39,818	245	34	61.53	8.54	Shiawassee...	33,866	47	10	13.88	2.95
Ionia.........	34,329	64	14	18.64	4.08	St. Clair......	55,228	85	15	15.39	27.16
Iosco	10,246	4	3	3.90	2.93						
						St. Joseph....	23,889	20	4	8.37	1.67
Iron	8,990	34	2	37.82	2.22	Tuscola.......	35,890	89	10	24.80	2.79
Isabella	22,784	55	10	24.14	4.39						
Jackson	48,222	155	30	32.14	6.22	Van Buren...	33,274	48	6	14.43	1.80
						Washtenaw ..	47,761	52	11	10.89	2.30
Kalamazoo...	44,310	148	16	33.40	3.61						
Kalkaska	7,133	24	5	33.65	7.01	Wayne	348,793	424	114	12.16	3.27
Kent..........	129,714	210	45	16.19	3.47	Wexford	16,845	47	8	27.90	4.75

TABLE 3.—*Exhibiting the number of outbreaks of typhoid fever reported to have begun, to have ended, and to have been present, in each month of the year 1900, in Michigan.*

Outbreaks.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Outbreaks began..	56	21	39	28	27	41	90	139	230	169	76	80	996
Outbreaks ended..	35	31	38	34	26	22	21	51	76	147	164	190	835
Outbreaks present	89	82	98	84	77	93	160	274	456	549	451	373	....

TABLE 4.—*Exhibiting the number and per cent of cases of typhoid fever in Michigan in each month during the year 1900. (Includes each case for which the time during which it existed, was stated in reports. Each of such cases is counted in each month in which, or part of which, the case was reported to have existed.)*

	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Number of cases sick in any part of the month....	148	160	184	168	193	280	403	689	1,184	1,588	1,272	845
Per cent the cases sick in each month were of total reported cases............	3	3	4	3	4	5	8	13	23	31	25	16

The first line of figures in Table 4 shows the number of cases reported sick in any part of each month. As some of the cases were sick longer than one month, they are included in the cases sick in more than one month, therefore the sum of the cases sick in all the months exceeds the total of reported cases in 1900; and as the last line of figures in this table shows the per cent the cases sick in each month were of the exact number of cases reported to this office in 1900, the sum of the figures in the last line of the table exceeds 100.

Source of contagium of typhoid fever.—Of the 5,122 reported cases of typhoid fever in 1900, the local health officer stated the source of contagium to be as follows:

Traced to former cases, 290; attributed to infected, contaminated, or surface water, 1,015; cases reported as coming from outside jurisdiction, 262; attributed to filthy or unsanitary conditions, 263; contaminated milk or food supply, 32; cases, the source of contagium of which were reported as unknown, 2,187; cases, the source of contagium of which were not reported, or the statements were too indefinite for classification, 1,068; from flies, 5; total, 5,122.

Typhoid fever, or other sickness, following family reunion.—Soon after a family reunion held in August, 1900, in Springport township, Michigan, at which fifty people were in attendance, fully one-half the number were taken sick. In this outbreak the final report for the township of Springport stated that twelve cases, including five deaths, occurred in that township. As at this family gathering people were present from many different localities, the sickness was spread over a considerable area. This was an occasion when the public interests would have been better served if it had been practicable for the State Board of Health to have had a fund available for an investigation of this outbreak by an expert sanitarian.

The health officer of Springport township, Jackson county, reported an outbreak of typhoid fever, August 24, 1900, as follows:—

> "I hereby inform you that there are cases of typhoid fever in my district. I enclose a clipping of our local paper. I have had no report of such cases, nor have I known of them until late Wednesday evening. It seems from what I heard today that there has been twenty-two cases, some of them outside of my jurisdiction. As near as I can learn the disease is attributed to lemons used at this reunion. I have been told that the lemons were covered with a green mold and were wiped off and used. The only report I have received was from a doctor who is attending most of the cases, and I only received that Wednesday evening. Please send me printed matter for distribution, also advise me what is best to do."

With the view of obtaining accurate details of the nature and cause of an outbreak of sickness, Secretary Baker wrote to the health officer of Springport township, on August 28, 1900, apparently without reference to the letter from that officer of August 24, as follows:—

> "I recently learned of the poisoning which occurred last week at the Griffith family reunion. The newspaper report of the poisoning stated that ice cream caused the poisoning. Will you have the kindness to inform me fully where the ice cream was procured? How long had the ice cream stood before being eaten? Was there a bacteriological test made of any of the ice cream? If so, where was the test made and what was the result? What are the symptoms of those who appear to be most sick from the poisoning? I trust you will give full replies to each of these questions and also give me any further information which you may be able to discover. Whatever the cause of the sickness, kindly give me the details."

In reply to the above quoted letter, the health officer of Springport township, August 29th, 1900, wrote to the Secretary as follows:—

> "Yours of the 28th at hand. In reply I would say that the cases are typhoid fever at the Griffiths, as I stated in my first report to you. The people thought the cause due to lemons used which had bad spots on them and were moldy. I talked with the doctor this morning and he said the cause was unknown. There has now been two deaths, one lady last night. No one connected with the cases that I can learn attributes it to the ice cream. The symptoms are typhoid in all cases I am told.
>
> "I was informed this morning that nearly all the persons who were at the reunion were complaining of not feeling well on the day of the gathering,—when they first arrived. The physician is taking all precautions now and I don't think there will be many more cases. Most of them are getting along all right.
>
> "No tests of the ice cream were made that I can learn of. There were fifty at the reunion, and I think one-half or more have been sick since; some of them live in other townships."

September 5, 1900, the health officer again wrote to the secretary relative to this outbreak as follows:—

> "I sent you a report on the next morning after I received your request. I herewith send you a better one. The ice cream was made by Mr. Frank Robbins, on the old Griffith homestead. It was made about two hours before eaten, and was cooked in a porcelain steamer,—a double one. The freezers were all scalded out before being used. The ice had been used all summer by three families.
>
> "Two gallons of the water was sent to Lansing and they tell me was pronounced O. K. It was examined by Prof. Kedzie.
>
> "Mr. Robbins and sister did the cooking for this Griffith gathering, and he says the lemons were bought at Sterling & Crawfords, in Eaton Rapids, and that the next morning after being brought from there, some of them had a blue mold on them, a long fuzzy mold. He threw some of them out, but about four dozen of the better ones were used. Mr. Robbins says that there has not been a single one taken sick who did not drink this lemonade. There have no cases developed except among those who attended this gathering. Mr. Robbins says there has been only one death caused by typhoid fever. I have tried to make this as plain to you as possible and hope that it will be satisfactory."

The facts collected bearing on the source or nature of this outbreak of sickness are not sufficiently definite to establish the cause or nature of the disease with certainty; but apparently the disease was typhoid fever, and it was spread in some manner at this family reunion. As the drinking water was not tested bacteriologically, and as no person was taken sick who did not drink the lemonade, it seems quite possible that the typhoid fever was spread by the drinking water, and that the lemonade may have favored the passage of the specific germs through the stomach into the intestines.

Spread of typhoid fever due to neglected measures in isolation and disinfection.—Relative to an outbreak of typhoid fever in Arvon township, Baraga county, the health officer writes as follows:—

"The first person sick was Herman Bliss, a laborer employed in a lumber camp, situated in an adjoining township (Spurr township). How he contracted the fever it is impossible to find out without expensive investigation. After being sick a few days his employers removed him from camp to a farmer living in this township, who had a big family. They engaged a physician of L'Anse to attend him. This case was never reported to me, the health officer, or anyone on the board of health of this township, either by his employers or the physician. It appears that this doctor gave no instructions to the brother of the sick man, who was nursing, or to any one in the farmer's family, how to prevent the disease from spreading, and gave no protection to them against contracting the fever. The nursing brother was permitted to sleep in the same bed with the sick man, drink out of the same glass, etc. The bowel discharges from the sick man were thrown into the privy vault of privy used by the family, without disinfecting. About the 15th of December, 1900, I heard of the case and went there to fumigate, as I was informed that the sick man was recovering. I found affairs in a deplorable condition. The first person had just recovered and his brother, who had been nursing him, had contracted the disease and had a high fever. I immediately took charge of the cases and isolated them in separate room, provided them with nurse, fumigated the house and took every precaution possible under the circumstances. But it was too late, as the wife and one child in the farmer's family had contracted the disease and showed symptoms of fever in a few days. I then removed all the other children from the house and succeeded in stopping further proceeding.

"It seems probable that the brother nursing contracted the fever germs from the drinking glass used by the patient, and the farmer's wife and child very likely caught the fever from privy, or through some other source, from the discharges from the patient. However, I am positive that if the doctor had reported the case or taken the necessary precaution the outbreak could have been restricted to one case."

Contagium of typhoid fever attributed to contaminated water.—Relative to an outbreak of typhoid fever in Otisco township, Ionia county, Dr. Ohlinger, health officer of Belding city, wrote to the secretary as follows:—

"About one and a half miles east of the city of Belding, along Flat river, is a low piece of land called Howe's addition to the city of Belding. A part of this land lies in the city of Belding and the rest in the township of Otisco. On this addition there are living nine families, in three of which are four cases of typhoid fever. In another family there is a case of malarial fever (which is probably a mild case of typhoid fever). 'Howe's addition' is a sort of out-of-the-way place and none but the very poorest classes of people live there. What I wish to say is that I do not think that it is their 'filthiness' which is the cause of the fever but carelessness, except in one instance.

"I will give you the cases as they occurred and their probable cause:

"Nos. 1 and 2, man and wife. Drinking water from a spring that had a box in it about two and a half feet by four feet, the bottom of which was covered with decaying bark, sticks, leaves, dead angle worms, etc. The case of malarial fever, a married man, also gets water out of this spring. The weather turned colder about the time these cases came down, and I also had the spring cleaned out and a crock (tile) put in, and there are at this time no more new cases.

"No. 3. Man lives on a slight elevation. Well sixty feet north of house. Ground descending toward well. Well about seven feet deep with barrel in bottom. Water about one and a half to two feet deep. I found a pile of decayed vegetables and slops half way between house and well. I think our fall rains washed the filth from this 'slop pile' into the well and is the cause of this case, which I attributed to 'filthiness'.

"No. 4. Man drank river water for two weeks before he came down with the fever. The number of persons in the families where the fever prevails is as follows:

"Nos. 1 and 2. Man and wife and five children.

"No. 3. Man, wife and child about one and a half years old. Wife had a severe case of typhoid fever six years ago in the city.

"No. 4. Man and wife and child about one and a half years old."

The following quotation from a health officer's letter illustrates the opposition encountered, in some instances, in properly enforcing restrictive measures:

"We have here a house in which there have been four cases of typhoid this summer. They are now about all recovered. The family are contrary and refuse to permit me to disinfect the house according to my ideas. They have not done as I ordered from the first, or there would not have been four cases in the same family one after another. They are people that know it all and won't learn even by experience. Now I beg you to instruct me exactly by letter what process I am to carry out in disinfecting this house. Please to mention the fact that I have asked you for instructions in this particular case, and then detail in full what you wish me to do, so that I may go armed with your instructions to see these people again. I think that will cause them to submit to proper disinfection without trouble. It is hard to accomplish any good in such work where the family refuse to coöperate, and throw every possible obstacle in the way.

"I am handicapped in many ways in this public-health work through the ignorance and contrariness of the people, but I am doing my best, and I appreciate your interest in us, and the help you give me."

TABLE 5.—*First, second and third localities, where the second locality was infected with typhoid fever from the first, and the third was infected from the second; and the number of cases and deaths from typhoid fever in the first, second and third localities with the dates of the beginning and ending of each outbreak. (Compiled from reports of health afficers who were able to trace the source of the contagium to other localities.)*

First localities from which typhoid fever was spread.			**Second** localities infected from first.			**Third** localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Allegan county: Monterey township.....	3	0	Allegan county: Hopkins township.....	5	2			
Allegan county: Otsego* village......... (Jan. 26-March 2.)	1	0	Kalamazoo county: Richland village....... (May — May 28.)	1	0			
Antrim county...........	....	....	Gratiot county: Elba township......... (Oct. 25-Nov. 2.)	1	1			
			Montcalm county: Day township.......... (Sept. 7-Oct. 23.)	1	0			
Antrim county: Mancelona village...... (— Dec. 9.)	3	3	Grand Traverse county: Whitewater township. (Sept. 28-Oct.14.)	6	2			
Arenac county: Standish village........	†	....	Bay county: Gibson township....... (May 13-Oct. 25.)	5	0			
Baraga county: Baraga village..........	†	....	Marquette county: Ishpeming city........ (April 26-May, 1901.)	68	10			
Baraga county: Spurr township..........	†	....	Baraga county: Arvon township....... (Oct. 25-Feb. 28, 1901.)	4	0			
Bay county...............	....	....	Jackson county: Spring Arbor township: (Sept. 5-Sept. 26.)	1	0			
Bay county: West Bay City .... (Aug. 13-Jan. 15, 1901.)	40	5	Bay county: Mt. Forest township: (Sept. 26-Oct. 17.)	1	0			
Benzie county: Frankfort village.......	†	....	Benzie county: Benzonia township.... (— Aug. 10.)	1	1			
			Genesee county: Argentine township... (Dec. 6-Jan. 20, 1901.)	1	0			
			Osceola county: Marion village......... (Sept. 1-Nov. 26.)	5	2			
Berrien county: Benton township.......	2	1	Berrien county: Hagar township........ (Oct. 16-Jan. 11, 1901.)	2	1			
Branch county: Coldwater city.......... (July 9-Jan. 17, 1901.)	12	3	Branch county: Coldwater township... (Dec. 8-Feb. 2, 1901.)	1	0			

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* Health officer of second locality did not state whether it was from village or township.

† Typhoid fever was not reported to this office by the health officer of the "first" locality at the time it was said to have spread from there; showing that the disease, if present, was neglected; probably it was not reported to the health officer as the law requires.

TABLE 5.—CONTINUED.—*Movement of infection of typhoid fever.*

First localities from which typhoid fever was spread.			**Second** localities infected from first.			**Third** localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Calhoun county: Battle Creek city (May 8-Dec. 31.)	44	10	Calhoun county: Burlington village (July 12-Aug. 5.)	1	0			
			Lapeer county: Dryden village	1	0			
Charlevoix county: Boyne Falls village (—— Sept. 24.)	2	2	Mecosta county: Wheatland township (Oct. 10 Dec. 25.)	1	0			
Cheboygan county: Nunda township (Aug. 22-Nov. 29.)	13	4	Cheboygan county: Ellis township (Sept. 18-Nov. 24.)	1	0			
Chippewa county	...	....	Huron county: Huron township (Nov. 20-Dec. 5.)	1	1			
Chippewa county: Sault Ste. Marie city	400	14	Chippewa county: Pickford township (June ——.)	2	0			
			Emmet county: Harbor Springs village (Sept. 14-Oct. 6.)	1	0			
Chippewa county: Trout Lake township	†	....	Chippewa county: Rudyard township (Sept. 29-Nov. 10.)	1	0			
Clare county: Hatton township (Sept.-Dec.)	7	3	Clare county: Clare city (Sept. 28 ——.)	1	0			
Clinton county: Duplain* (village)	....	....	Clinton county: Elsie village (Jan. 10-Jan. 23.)	1	1			
Clinton county: Maple Rapids (Nov. 1-Nov. 15)	1	0	Gratiot county: Ithaca village (Nov. 20-Dec. 15.)	1	0			
Clinton county: Ovid township (Sept. 17-Dec. 22.)	7	1	Clinton county: Victor township (Oct. 6-Jan. 12, 1901.)	5	0			
			Shiawassee county: Vernon township (Sept. 29-Nov. 30.)	3	1			
Clinton county: St. Johns village (March 10-Dec. 31.)	2	1	Clinton county: Greenbush township (March 14-April 1.)	1	0			
Dickinson county: Norway city	†	....	Ontonagon county: Rockland township (Oct. 22-Dec. 1.)	3	0			
Eaton county: Bellevue village (July 3-Oct. 20.)	19	1	Barry county: Irving township (Aug. 24 ——.)	2	0			
			Eaton county: Olivet village (July 7-Aug. 10.)	5	1			
			Walton township (July 6-Aug. 5.)	1	0			
			Ionia county: Danby township (July 17-Aug. 18.)	1	0			

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* Health officer of second locality did not state whether it was from village or township.

† This foot-note is on the bottom of the first page of this table.

TABLE 5.—CONTINUED.—*Movement of infection of typhoid fever.*

First localities from which typhoid fever was spread.			**Second** localities infected from first.			**Third** localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Eaton county: Brookfield* (township) (Sept. 3-Oct. 6.)	1	0	Eaton county: Eaton Rapids township (Oct. 2-Nov. 1.)	1	0			
Eaton county: Charlotte city (May 1-Feb. 2, 1901.)	35	3	Eaton county: Eaton Rapids city (June 12-July 30.)	1	0			
			Windsor township (Oct. 7-Oct. 25.)	1	0			
Eaton county: Chester township	2	0	Eaton county: Benton township	1	0			
Eaton county: Grand Ledge city (Sept.-Oct.)	1	0	Eaton county: Benton township	2	2	Ionia county: Berlin township (Dec. 7-Dec. 26.)	1	1
			Ionia county: Ionia city (Sept. 12-Oct. 15.)	1	0	Boston township (Nov. 6-Nov. 18.)	1	1
						Orleans township	1	1
						Charlevoix county: Hayes township (Sept. 22-Sept. 30.)	1	1
Eaton county: Sunfield* (township) (July 13-Oct. 17.)	2	0	Ionia county: Danby township (Oct. 15 ——.)	1	0			
Emmet county	....	...	Allegan county: Lee township (Nov. 1-Dec. 10.)	2	0			
Emmet county: Bear Creek township (July 25-Sept. 14.)	2	2	Clinton county: Riley township (Oct. 18-Nov. 3.)	1	1			
Emmet county: Center township	5	0	Emmet county: Egleston township (—— Sept.)	4	0	Montcalm county: Maple Valley tp. (Sept. 18-Oct. 30.)	1	0
			Mecosta county: Martiny township (Aug. 10-Dec. 23.)	12	2			
			Morton township (Oct. 2-Dec. 5.)	1	0			
Emmet county: Petoskey city (Feb. 25-Jan. 5, 1901.)	8	2	Calhoun county: Albion city	1	0			
			Wayne county: Northville village (Aug. 27-Nov. 1.)	4	1			
			Wexford county: Cedar Creek township (June 3-Jan. 18, 1901.)	10	0			
Grand Traverse county: Traverse City (May 3-Jan. 12, 1901.)	32	3	Montcalm county: Maple Valley township (Sept. 20-Nov. 10.)	1	0			
Gratiot county	....	...	St. Clair county: Grant township (Nov. 5-Dec. 25.)	1	0			
Gratiot county: Alma village (Oct. 29-Nov. 7.)	1	1	Midland county: Edenville township (Dec. 6 ——.)	1	0			
Gratiot county: Arcada township	†	....	Gratiot county: Pine River township (Sept. 19-Dec. 22.)	3	0			
Gratiot county: St. Louis (Aug. 5-Nov. 19.)	7	2	Shiawassee county: Fairfield township (Nov. 23-Dec. 26.)	1	0			

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* Health officer of second locality did not state whether it was from village or township.

† This foot-note is on the bottom of the first page of this table.

TABLE 5.—CONTINUED.—*Movement of infection of typhoid fever.*

First localities from which typhoid fever was spread.			**Second** localities infected from first.			**Third** localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Hillsdale county: Hillsdale city (Sept. 1-Jan., 1901.)	14	1	Hillsdale county: Cambria township (Oct. 24 ——.)	1	0			
			Jackson county: Brooklyn village (Nov. 6-Dec. 20.)	1	0			
Hillsdale county: Somerset township	2	0	Jackson county: Columbia township	1	1			
Huron county: Brookfield township	†	....	Huron county: Grant township (Sept. 28-Dec. 8.)	1	0			
Huron county: Sand Beach township (July ——.)	2	0	Huron county: Sherman township (Oct. 6 ——.)	3	0			
Ingham county: Lansing city (Jan.-Jan., 1901.)	154	13	Ingham county: Alaiedon township (Aug. 15 ——.)	1	0			
Ingham county: Meridian township (Jan. 10-Oct. 25.)	18	6	Ingham county: Alaiedon township (Aug. 11 ——.)	1	0			
Ingham county: Onondaga township (Oct. 18-Jan., 1901.)	3	1	Jackson county: Tompkins township (Nov. 6-Dec. 17.)	2	1			
Ingham county: Wheatfield township (Aug. 4-Nov. 16.)	2	0	Ingham county: Le Roy township (Nov. 26-Dec. 18.)	2	0			
Ionia county: Belding city (Aug. 24-Oct. 10.)	1	0	Montcalm county: Eureka township (—— Sept. 20.)	1	1			
Ionia county: Odessa township (Sept. 6-Oct. 10.)	1	0	Ionia county: Berlin township (Sept. 18 ——.)	1	0			
Ionia county: Orleans township (Sept. 1-Oct. 22.)	2	0	Ionia county: Belding City (Oct. 15-Dec. 25)	2	0			
Isabella county: Shepherd village (July ——.)	8	0	Isabella county: Lincoln township (Sept. 8-Jan. 29, 1901.)	2	0			
Jackson county: Jackson city (Jan. 11-Dec. 31.)	65	16	Calhoun county: Homer village (Feb. 1-Feb. 17.)	1	0			
			Ingham county: Stockbridge township (Sept. 12-Oct. 13.)	1	0			

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† This foot-note is on the bottom of the first page of this table.

TABLE 5.—CONTINUED.—*Movement of infection of typhoid fever.*

First localities from which typhoid fever was spread.			Second localities infected from first.			Third localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Jackson county: Jackson city (Jan. 11-Dec. 31.)	65	16	Jackson county: Norvell township (Mar. 15-May 5.)	1	0			
			Spring Arbor township (Sept. 6-Oct. 5.)	1	0			
			Waterloo township (July 8-Aug. 28.)	1	0			
			Oceana county: Golden township (Sept. 14-Dec. 28.)	5	0			
			Washtenaw county: Bridgewater township. (Mar. 14-Mar. 29.)	1	1			
			Manchester village (Oct. 17-Dec. 25.)	1	0			
Jackson county: Parma village (July 15 —.)	1	0	Barry county: Irving township (Sept. 14 —.)	1	0			
Jackson county: Springport township (Aug. 11-Oct. 24)	12	5	Allegan county: Allegan village (Aug. 27-Oct. 17.)	3	0			
			Jackson county: Tompkins township (Aug.-Sept. 1.)	1	1			
Kalamazoo county: Kalamazoo city (Jan. 6-Dec. 29.)	71	9	Allegan county: Heath township (Sept. 28-Oct. 31.)	1	0			
Kalamazoo county: Vicksburg village (Sept. 29-Dec. 31.)	48	3	Kalamazoo county: Pavilion township (Oct. 9-Nov. 1.)	2	0			
			Schoolcraft township (Oct. 1-Oct. 22.)	1	0			
Kalkaska county	....	....	Missaukee county: Bloomfield township (Sept. 20-Oct. 20.)	1	0			
			Osceola county: Middle Branch tp (Sept. 1-Oct. 8.)	1	0			
Kalkaska county: Fife Lake village	†	....	Kent county: Sparta township (July 22-Sept. 9.)	4	2			
			Sparta village (Aug. 29-Oct. 30.)	2	1			
Kalkaska county: Kalkaska* (village)	6	0	Cass county: Cassopolis village (Aug. 1-Aug. 20.)	1	1			
Kent county: Alpine township	†	....	Kent county: Sparta township (Oct. 15-Jan. 1, 1901.)	1	0			

* Health officer of second locality did not state whether it was from village or township.

† This foot-note is on the bottom of the first page of this table.

TABLE 5.—CONTINUED.—*Movement of infection of typhoid fever.*

First localities from which typhoid fever was spread.			Second localities infected from first.			Third localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Kent county: Grand Rapids city (Jan. 1-Dec. 31.)	162	28	Allegan county: Dorr township (Sept. 7-Dec. 20.)	6	0			
			Barry county: Nashville village (Mar. 29-Apr. 19.)	1	0	Leelanau county: Kasson township	1	1
			Ionia county: Belding city (Sept. 1-Oct. 5.)	1	0			
			Kalamazoo county: Charleston township (Dec. 24-Mar. 5, 1901.)	1	0			
			Kent county: Paris township (Sept. 23-Nov. 8.)	4	1			
			Rockford village (Dec. 20-Jan. 2, 1901.)	1	1			
			Montcalm county: Greenville city (Nov. 3-Dec. 10.)	1	0			
			Maple Valley tp. (Apr. 11-June 1.)	2	0			
			Muskegon county: Norton township (May 30-June 3.)	1	1			
			Ottawa county: Georgetown township Feb. 26-Mar. 7.)	1	1			
Lake county: Baldwin village	†	....	Benzie county: Thompsonville village (Sept. 25-Nov. 30.)	10	1			
			Isabella county: Nottawa township (Oct. 26-Nov. 28.)	2	0	Montcalm county: Crystal township (Nov. 26-Jan. 15,1901.)	1	0
			Newaygo county: Everett township (Oct. 31-Nov. 10.)	1	1			
Lake county: Cherry Valley township (Oct. 30-Dec. 15.)	3	0	Lake county: Pinora township (Dec. 5-Jan. 8, 1901.)	1	0			
Lapeer county	....	....	Wayne county: Northville village (Nov. 10-Dec. 15.)	1	0			
Lenawee county: Adrian city (June 23-Nov. 28.)	39	6	Lenawee county: Addison village (Sept.-Oct. 22.)	2	1			
			Rome township (Aug. 24-Oct. 21.)	2	1			
Lenawee county: Fairfield township (June 4-Jan. 27, 1901.)	21	2	Lenawee county: Madison township (July 30-Nov. 19.)	5	0			
Lenawee county: Macon township	†	....	Lenawee county: Tecumseh township (Oct. 2-Nov. 2.)	1	0			

† This foot-note is on the bottom of the first page of this table.

TABLE 5.—CONTINUED.—*Movement of infection of typhoid fever.*

First localities from which typhoid fever was spread.			**Second** localities infected from first.			**Third** localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Lenawee county: Raisin township (Sept. 24-Nov. 10.)	3	1	Lenawee county: Deerfield township (Oct. 28 ——.)	1	0			
Livingston county: Howell township (Sept.-Dec.)	17	2	Ingham county: LeRoy township (Dec. 8-Dec. 27.)	1	1			
Mackinac county: St. Ignace city	†	....	Mackinac county: Moran township (Oct. 25-Nov. 30.)	1	0			
Macomb county: Mt. Clemens city (Jan.-Dec.)	159	15	Macomb county: Clinton township (June 4-Sept. 1.)	3	1			
			Clinton township	11	4			
			Macomb township (June 8-Oct. 15.)	20	2			
			Ottawa county: Holland city (July 1-Aug.)	1	0			
Marquette county	....	....	Baraga county: Arvon township (Dec. 10-Feb. 1, 1901.)	1	0			
Marquette county: Negaunee city (—— Dec.)	16	2	Marquette county: Champion township (Oct. 13-Nov. 1.)	1	0			
Mason county: Custer township (Oct. 27-Nov. 25.)	4	3	Mason county: Sherman township. (Oct. 28-Dec. 11.)	7	0			
Mason county: Riverton township	†	....	Mason county: Custer village (June 9-June 19.)	1	1			
Mecosta county	....	....	Kent county: Tyrone township (Sept. 11-Oct. 21.)	3	0			
Mecosta county: Big Rapids (city) (Aug. 9-Dec. 23.)	16	6	Kalkaska county: Rapid River township. (Sept. 29-Oct. 2.)	2	2			
Midland county: Midland city (Sept. 24 ——.)	5	1	Midland county: Ingersoll township (Oct. 30-Nov. 21.)	1	0			
Missaukee county	....	....	Muskegon county: Casnovia village (Aug. 16-Sept. 13.)	3	0	Clinton county: Watertown township (Aug. 25-Nov. 30.)	5	1
Missaukee county: Norwich township (Aug. 4 ——.)	7	2	Missaukee county: Butterfield township (Oct. 15-Oct. 28.)	1	1			
Monroe county	....	....	Ogemaw county: Cummings township (Oct. 15-Oct. 31.)	1	1			
			Washtenaw county: Dexter village (Dec. 6-Jan. 24, 1901.)	1	0			
Monroe county: Dundee township (Sept. 29-Feb. 1, 1901.)	4	0	Lenawee county: Franklin township (Nov. 3-Nov. 17.)	1	1			
Monroe county: Milan township (July 17-Dec. 12.)	8	1	Washtenaw county: Augusta township (Nov. 9-Nov. 23.)	1	0			

† This foot-note is on the bottom of the first page of this table.

TABLE 5.—CONTINUED.—*Movement of infection of typhoid fever.*

First localities from which typhoid fever was spread.			Second localities infected from first.			Third localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Monroe county: Summerfield township. (Oct. 2-Nov. 4.)	5	1	Lenawee county: Dover township........ (Oct. 10-Nov. 3.)	1	0			
Montcalm county: Crystal township.......	1	1	Ionia county: Berlin township....... (Sept.-Sept. 21.)	1	1			
Montcalm county: Lakeview village........	†	....	Montcalm county: Greenville city........ (Aug. 5-Oct. 1.)	1	0			
Muskegon county........	....	....	Manistee county: Copemish village...... (Feb. 1-Mar. 2.)	1	0			
Muskegon county: Muskegon city.......... (Jan.-Mar. 31.)	14	3	Charlevoix county: Charlevoix village.... (Aug. 8-Dec. 14.)	10	1			
			Muskegon county: Casnovia village....... (Oct. 26-Jan. 29, 1901.)	2	1			
			Holton township....... (Dec. 3-Dec. 17.)	1	1			
Muskegon county: Whitehall village.......	1	1	Muskegon county: Fruitland township....	2	2			
Newaygo county.........	....	....	Mecosta county: Mecosta township...... (Sept. 26-Oct. 11.)	2	0			
Newaygo county: Fremont village........ (Aug. 31-Sept. 1.)	1	1	Newaygo county: Sherman township.... (Oct.-Jan. 7, 1901.)	5	0			
Northern Michigan......	....	....	Clinton county: Riley township........ (Feb. 15-Mar. 10.)	1	0			
			Ingham county: Ingham township...... (June 6-July 16.)	1	1			
Oakland county: Milford township.......	†	....	Ingham county: Meridian township.... (May 14-June 20.)	1	0			
Oakland county: Pontiac city............. (Aug. 31-Nov. 15.)	8	3	Macomb county: Armada village........ (— Sept. 15.)	3	0			
			Oakland county: Troy township.......... (Dec. 16-Jan. 18, 1901.)	2	0			
Oakland county: Rochester village...... (Aug. 1-Dec. 5.)	10	2	Oakland county: Addison township..... (Nov. 14-Dec. 19.)	1	0			
Osceola county..........	....	....	Lake county: Luther village......... (Sept. 16-Oct. 14.)	1	0			
Osceola county: Hersey village..........	†	....	Mason county: Sheridan township.... (June 25-July 25.)	1	0			
Osceola county: Rose Lake township.... (— Nov. 11.)	1	1	Osceola county: LeRoy township....... (Nov. 15-Dec. 20.)	5	0	Osceola county: Lincoln township...	1	1
						Ottawa county: Tallmadge township (Nov. 15-Jan. 2, 1901.)	1	0

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† This foot-note is on the bottom of the first page of this table.

TABLE 5.—CONTINUED.—*Movement of infection of typhoid fever.*

First localities from which typhoid fever was spread.			**Second** localities infected from first.			**Third** localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Otsego county: Gaylord village......... (—— Jan. 1, 1901.)	21	2	Emmett county: Harbor Springs village (Sept. 1-Sept. 25.)	1	0			
Presque Isle county: Onaway village......... (Aug. 20-Jan. 20, 1901.)	52	3	Alpena county: Wilson township....... (Sept. 1-Dec. 8.)	5	2			
			Sanilac county: Lexington village..... (Nov. 23-Jan. 31, 1901.)	1	0			
Saginaw county: Jonesfield township....	1	1	Saginaw county: Lakefield township.... (Sept. 16-Nov. 17.)	2	0			
Saginaw county: Marion township....... (Sept. 27-Feb. 1, 1901.)	6	2	Saginaw county: Delaware township.... (Aug. 1-Dec. 22.)	4	1			
			Taymouth township... (Oct. 17 ——.)	1	0			
Saginaw county: Saginaw city............ (Jan.-Dec.)	39	13	Macomb county: Romeo village......... (Sept. 12-Oct. 18.)	2	2			
Sanilac county: Buel township.......... (Aug. 10-Dec. 25.)	7	1	Sanilac county: Lexington township... (Aug.-April 4, 1901.)	15	1			
Sanilac county: Sanilac Center village.. (Aug. 27-Oct. 1.)	2	1	Sanilac county: Wheatland township.. (Nov. 12-Jan. 6, 1901.)	2	0			
Schoolcraft county......	....	....	Macomb county: Erin township......... (Sept.-Jan., 1901.)	3	1			
Shiawassee county: Morrice village.........	†	...	Shiawassee county: Bancroft village....... (Nov. 1-Dec. 1.)	1	0			
Southern part of State...	....	....	Isabella county: Sherman township..... (July 14-Aug. 13.)	1	0			
St. Clair county: Port Huron city......... (Jan.-Feb., 1901.)	39	9	Sanilac county: Worth township...... (Sept. 25-Dec. 14.)	5	0			
St. Joseph county: Leonidas township.....	1	0	Ionia county: Boston township....... (Mar. 5-April 15.)	1	0			
St. Joseph county: Three Rivers village... (May 1. ——.)	1	0	Kalamazoo county: Vicksburg village..... (Aug. 16-Aug. 20.)	1	1	St. Joseph county: Park township....... (Sept. 23-Jan. 12, 1901)	2	0
Tuscola county: Arbela township........ (Sept. 28-Dec. 28.)	7	0	Genesee county: Thetford township... (Dec. 22-Jan. 18, 1901.)	4	1			
Tuscola county: Cass City village........ (Nov. 10-Dec. 12.)	1	0	Lapeer county: Arcada township...... (Dec. 8 ——.)	1	0			
Tuscola county: Fair Grove township... (Sept. 1-Dec. 12.)	29	2	Huron county: Sebewaing village..... (Aug. 11 ——.)	1	0			
Upper Peninsula........	....	....	Gladwin county: Tobacco township..... (Aug. 23-Dec. 16.)	4	1			

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† This foot-note is on the bottom of the first page of this table.

TABLE 5.—CONTINUED.—*Movement of infection of typhoid fever.*

First localities from which typhoid fever was spread.			Second localities infected from first.			Third localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Van Buren county: South Haven village...	6	0	Allegan county: Fennville village...... (Sept. 19-Nov. 28.)	5	1			
			Berrien county: Watervliet township.. (Sept. 18-Nov. 17.)	1	0			
			Van Buren county: Almena township...... (Aug. 5-Dec. 15.)	2	0			
			South Haven township	1	0			
Washtenaw county: Ann Arbor* (city)....... (June 28-Dec.)	9	4	Jackson county: Rives township........ (July 26-Aug. 28.)	1	0			
Washtenaw county: Milan village........... (July 8-Feb. 3, 1901.)	14	1	Lenawee county: Cambridge township.. (Sept. 20-Sept. 28.)	3	1			
Washtenaw county: Ypsilanti city........... (June 1-April 20, 1901.)	9	3	Ingham county: Stockbridge township. (Oct. 10-Dec. 1.)	1	0			
			Washtenaw county: Augusta township..... (Oct. 11-Jan. 5, 1901.)	6	1			
Wayne county: Detroit city...	256	76	Berrien county: Niles city... .... (July 10-Aug. 27.)	1	0			
			Crawford county: Grayling township..... (Sept. 25-Oct. 15.)	1	1			
			Gratiot county: Alma village........... (July-July.)	1	0			
			Kent county: Byron township......... (July 15-Sept. 15.)	1	0			
			Macomb county: Warren township...... (Oct. 20-Nov. 18.)	8	1			
			Oakland county: Pontiac township...... (Oct. 2-Nov. 15.)	1	0			
			Ottawa county: Grand Haven city..... (July 30-Sept. 3.)	1	1			
			Saginaw county: Chesaning village..... (June 28-Aug. 5.)	2	1			
			Sanilac county: Deckerville village.... (Aug. 1-Oct. 6.)	2	1	Sanilac county: Marion township..... (Sept. 17-Oct. 25.)	1	0
			St. Clair county: Wales township........ (Nov. 2-Dec. 15.)	1	0			
			Washtenaw county: Salem township........ (Jan. 15-Feb. 7.)	1	1			
			Wayne county: Livonia township...... (Aug. 11-Oct. 3.)	1	0	Wayne county: Plymouth village.... (Jan. 13-Jan. 30.)	1	0

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* Health officer of second locality did not state whether it was from village or township.

TABLE 5.—CONTINUED.—*Movement of infection of typhoid fever.*

First localities from which typhoid fever was spread.			**Second** localities infected from first.			**Third** localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Wayne county: Monguagon township (Mar. 4-April 22.)	1	1	Monroe county: Berlin township (Apr.-May 9.)	1	1			
Wayne county: Wayne village	5	1	Livingston county: Brighton township (Nov. —.)	1	0			
			Wayne county: Nankin township (Dec.-Feb. 1, 1901.)	1	0			
Wayne county: Wyandotte city (Jan.-Dec.)	37	5	Branch county: Bronson village (Oct.-Dec.)	4	0			
			Lapeer county: Arcada township (Aug. 10-Sept. 17.)	1	1			
			Monroe county: Exeter township (Oct. 4-Dec. 10.)	8	3			
			Raisinville township (June 2-July 10.)	1	0			
Wexford county	....	....	Lake county: Luther village (Oct. 5-Nov. 6.)	1	0			
Wexford county: Springville township	3	2	Osceola county: Middle Branch tp (Nov. 1-Jan. 6, 1901.)	1	1			
Movement of infection of typhoid fever **into Michigan** from outside the State.								
Canada	....	....	Huron county: Lake township (Nov. 20-Dec. 5.)	1	1			
			Iosco county: Burleigh township (Sept. 16-Dec. 16.)	3	2			
Canada: Woodstock	....	....	Ionia county: Easton township (Oct. 30-Nov. 25.)	1	1			
Colorado	...	....	Tuscola county: Wisner township (Sept. 7-Sept. 21.)	1	0			
Dakota	....	....	Jackson county: Sandstone township (Sept. 1-Dec.)	4	0			
Illinois: Chicago	....	....	Allegan county: Allegan village (Aug. 2-Aug. 15.)	1	1			
			Berrien county: Watervliet village (Oct. 26-Nov. 8.)	1	1			
			Charlevoix county: Charlevoix village (Mar. 25-June 25.)	2	0			
			Shiawassee county: Antrim township (July 20-Aug. 27.)	1	0			

TABLE 5.—CONTINUED.—*Movement of infection of typhoid fever* **into Michigan** *from outside the State.*

First localities from which typhoid fever was spread.			Second localities infected from first.			Third localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Illinois: Kewanee	....	....	Ionia county: Portland village (Jan. 7-Mar. 27.)	1	0			
Indiana	....	....	Allegan county: Casco township (Sept. 6-Oct.)	1	0			
			Berrien county: Watervliet village (Dec. 3-Dec. 29.)	1	0			
			Ionia county: Boston township (Mar. 7-May 4.)	1	0			
			Isabella county: Mt. Pleasant city (Sept. 15 ——.)	3	0			
			Isabella county: Wise township (Sept. 12 ——.)	1	0			
			Ottawa county: Chester township (Aug. 1 ——.)	5	2			
Indiana: Bluffton	....	....	Branch county: Coldwater city (Jan. 15-Jan. 26.)	1	1			
Indiana: Goshen	....	....	Cass county: Porter township (Oct. 20-Dec. 13.)	1	0			
Indiana: Stillwell	....	....	Berrien county: Buchanan township (July 31-Nov. 7.)	4	2			
Minnesota	....	....	Barry county: Barry township (Sept. 24-Mar. 15, 1901.)	5	0			
Minnesota: Sparta	....	....	Marquette county: Champion township (Dec. 1-Jan. 7, 1901.)	1	0			
Minnesota: Two Harbors	....	....	Marquette county: Humboldt township (Nov. 1-Jan. 20, 1901.)	1	0			
Mississippi: Poplarville	....	...	Montcalm county: Edmore village (June 15-June 30.)	1	1			
Montana	....	....	Lapeer county: Burnside township (Nov. 10-Nov. 28.)	1	1			
Montana: Butte City	....	....	Gogebic county: Bessemer township (Sept. 1-Nov. 9.)	3	1			
New York: Buffalo	....	....	Bay county: Fraser township (Aug. 22-Nov. 1.)	10	3			
New York: Crownpoint	....	....	Emmet county: Maple River township. (Dec. 2 ——.)	2	0			

TABLE 5.—CONTINUED.—*Movement of infection of typhoid fever* **into Michigan** *from outside the State.*

First localities from which typhoid fever was spread.			**Second** localities infected from first.			**Third** localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Ohio	....	....	Branch county: California township (Sept. 13-Oct. 20.)	1	0			
			Clinton county: Greenbush township (Aug. 15-Sept. 5.)	1	0			
			Ingham county: Union township (Sept. 1-Dec. 28.)	15	3			
			Lenawee county: Clinton village (Aug. 28-Nov.)	2	0			
Ohio: Bowling Green	....	....	Washtenaw county: Northfield township (Oct.-Oct. 20.)	1	0			
Pennsylvania	...	....	Lenawee county: Morenci village (—— Sept. 19.)	1	1			
Pennsylvania: Pittsburg.	....	....	St. Joseph county: Park township (Jan. 2 ——.)	1	0			
Tennessee: Memphis	....	....	Calhoun county: Albion city (Aug. 2-Sept. 16.)	2	0			
Wisconsin	....	....	Benzie county: Weldon township (Sept. 13 ——.)	*3	1			
Wisconsin: Ashland	....	....	Gogebic county: Bessemer city (Dec. 20-Jan. 26, 1901.)	1	1			
Probable movement of infection of typhoid fever.								
Bay county: Bay City (Jan.-Dec.)	30	9	Macomb county: Romeo village (Mar. 8-Mar. 21.)	1	1			
Branch county: Girard township (Aug. 16-Nov. 25.)	5	2	Branch county: Union City village (Sept. 2-Dec. 31.)	4	0			
Charlevoix county: Hudson township (July 15-Nov. 15.)	9	2	Otsego county: Corwith township (Oct. 9-Dec. 5.)	4	0			
Eaton county: Bellevue* (village) (July 3-Oct. 20.)	15	1	Barry county: Rutland township (Aug. 5-Oct. 20.)	3	0			
Houghton county: Houghton village	5	2	Houghton county: Chassell township (Sept. 20-Nov. 20.)	3	0			

TABLE 5.—CONCLUDED.—**Probable** *movement of infection of typhoid fever.*

First localities from which typhoid fever was spread.			Second localities infected from first.			Third localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Ionia county: Belding city............ (Oct. 2-Dec. 10.)	1	0	Kent county: Grattan township...... (Nov. 1-Nov. 25.)	1	0			
Jackson county..........	....	....	Ingham county: Aurelius township..... (Aug. 8-Nov. 12.)	3	0			
Jackson county: Jackson city............ (Jan. 11-Dec. 31.)	65	16	Calhoun county: Tekonsha village...... (Aug. 1 ——.)	1	0			
Lenawee county: Deerfield* (township)...	1	1	Monroe county: Ash township.......... (Jan. 10-Jan. 23.)	1	1			
Lenawee county: Tecumseh (village)..... (Sept. 20-Dec. 15.)	2	0	Hillsdale county: Somerset township... (Aug. 21-Oct. 10.)	2	0			
Macomb county: Mt. Clemens city........ (Jan.-Dec.)	159	15	Livingston county: Genoa township........ (July 25-Sept. 1.)	5	0			
Ontonagon county: Ontonagon (village).... (Sept. 14-Feb. 16, 1901.).	5	0	Ontonagon county: Greenland township... (Oct. 1-Nov. 3.)	1	0			
Van Buren county: Waverly township...... (Oct. 1-Nov. 15.)	1	0	Van Buren county: Paw Paw township..... (June 20 ——.)	2	0			

* Health officer of second locality did not state whether it was from village or township.

Measures taken to restrict typhoid fever—results.—In studying the effects of efforts of health officers for the restriction and prevention of typhoid fever, and of the difficulties experienced by some of them in carrying out the methods recommended by the State Board of Health to that end, it is interesting to note the difference in the reported number of cases of sickness and of deaths from this disease, in outbreaks where local health officers were able to enforce isolation and disinfection, and in those outbreaks in which, for any reason, those restrictive measures were neglected.

By Table 6 it may be seen that in the outbreaks relative to which the reports state that isolation and disinfection were enforced, there occurred 2.22 cases, including .39 of one death per outbreak; whereas, in those outbreaks in which isolation and disinfection were neglected there were 6.72 cases, including one death per outbreak, or three times as many cases and more than twice as many deaths in outbreaks in which isolation and disinfection were neglected as there were in those outbreaks in which the restrictive measures were enforced.

An examination of Table 6 shows that there were 507 outbreaks where isolation and disinfection were doubtful, and that the number of cases to the outbreak was much greater than in those outbreaks where isolation and disinfection were enforced.

In the compilation of the reports for Tables 6 and 7 and the diagram showing the results obtained by isolation and disinfection, every effort has been made to place the numbers of cases and deaths in each outbreak in the proper columns. If, for instance, there were only one or two cases in an outbreak and the health officer neglected to isolate or disinfect, but for some reason the disease spread no further, the number of cases and deaths were placed in the column headed "Isolation and disinfection both neglected." If, on the other hand, as often occurs, quite a number of persons are exposed at the same time and place outside the health officer's jurisdiction, and by proper isolation and disinfection he succeed in confining the disease to the original cases exposed, they are placed in the column headed "Isolation and disinfection enforced." If, however, he neglects to properly isolate or disinfect, the whole number of these cases and deaths are placed in the "neglected" column. It is to be regretted that many of the reports received at this office do not state exactly what was done to restrict the disease, or are not sufficiently definite to enable the compilers to decide just what was done, and they are obliged to place all such in the column headed "Isolation or disinfection or both not mentioned, or statements doubtful."

Table 7 indicates that in 1900 there was a saving of 2,873 cases, including 309 lives, through isolation and disinfection.

In the ten years, 1890-99, in those outbreaks in which isolation and disinfection were neglected the average number of cases per outbreak was 5.82 and the average number of deaths .85 of one death; and in those outbreaks, in this period of years, in which restrictive measures were enforced, the average number of cases per outbreak was 3.13 and the average number of deaths per outbreak was .53 of one death.

Of the 1,330 males and 996 females who were reported to have died from typhoid fever within the thirteen years, 1887-99, and of which the interval between the day of being taken sick and the day of death was given, 20 per cent of males and 23 per cent of females died before the eleventh day of sickness; 16 per cent of males and 22 per cent of females died after ten to fifteen days of sickness. Sixty-nine per cent of males and 72 per cent of females died before the twenty-sixth day of sickness.

Average duration of typhoid fever.—Fatal and non-fatal cases.—The average duration of fatal cases of typhoid fever in 1900 was 20.7 days for males and 20.5 days for females.

In table 9 it may be noticed that in *non-fatal* cases of typhoid fever for the thirteen years 1887-99, 61 per cent of the males and 64 per cent of the females recovered before the thirty-sixth day of sickness. The average duration of non-fatal cases in 1900 was, in males 34.5 days, and in females 33.8 days.

The average duration of cases of typhoid fever in 1900, fatal and non-fatal, was 31.6 days for males, 30.9 days for females, and 31.3 days for both sexes.

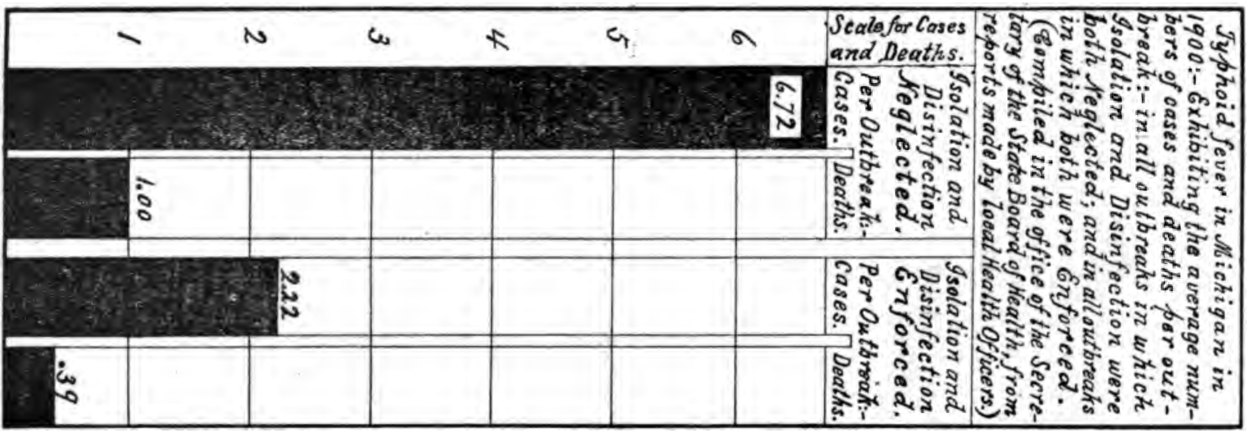
Age of occurrence of typhoid fever.—Table 10 shows that of the 2,024 males and 1,512 females who were sick with typhoid fever in 1900, and of whom the ages were reported, the greatest per cent of males were of ages between twenty and twenty-four years; and of females (in any five year period) was between fifteen and nineteen years.

TABLE 6.—TYPHOID FEVER IN MICHIGAN IN 1900: *Exhibiting the numbers and average numbers of cases and deaths per outbreak— (1) in all the 1,083 outbreaks reported; (2) in the 507 outbreaks in which it is doubtful whether or not disinfection or isolation was enforced; (3) in the 20 outbreaks in which disinfection was enforced and isolation was doubtful; (4) in the 51 outbreaks in which isolation was enforced and disinfection was doubtful; (5) in the 99 outbreaks in which isolation was enforced and disinfection was neglected; (6) in the 21 outbreaks in which disinfection was enforced and isolation was neglected; (7) in the 215 outbreaks in which both isolation and disinfection were neglected; (8) in the 170 outbreaks in which both isolation and disinfection were enforced.*

	(1) All outbreaks. (1,083 outbreaks.*)		(2) Isolation or disinfection or both not mentioned, or statements doubtful. (507 outbreaks.)		(3) Disinfection enforced —isolation doubtful. (20 outbreaks.)		(4) Isolation enforced — disinfection doubtful. (51 outbreaks.)		(5) Isolation enforced — disinfection neglected. (99 outbreaks.)		(6) Disinfection enforced —isolation neglected. (21 outbreaks.)		(7) Isolation and disinfection both neglected. (215 outbreaks.)		(8) Isolation and disinfection both enforced. (170 outbreaks.)	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals....	4,405	774	2,089	402	56	7	101	20	311	59	26	4	1,444	216	378	66
Averages	4.07	.71	4.12	.79	2.80	.35	1.98	.39	3.14	.60	1.24	.19	6.72	1.00	2.22	.39

* These do not include the cases and deaths in Detroit, Grand Rapids, Kalamazoo, Bay City, Battle Creek, Lansing, Jackson, Saginaw, and Mussey township, because of the difficulty in determining the beginning and ending of an outbreak in these localities, in which the disease was present in some part of the locality nearly all the time.

ISOLATION AND DISINFECTION RESTRICT TYPHOID FEVER.



This diagram graphically represents the lower line of figures in ***the last four columns*** *of Table 6.*

[PLATE 1103]

TABLE 7.—TYPHOID FEVER IN MICHIGAN: *Exhibiting for the year 1900, and for the ten year period, 1890-99, the numbers of reported outbreaks, cases and deaths in all outbreaks, and the numbers of outbreaks, cases and deaths for the same year and period of years, relative to which restrictive measures were neglected, and the numbers relative to which those measures were enforced; also the estimated numbers of cases and deaths prevented, in said year and period of years, by isolation and disinfection.*

Years.	All outbreaks.			Isolation and disinfection both neglected.			Isolation and disinfection both enforced.			Cases and deaths indicated as having been prevented by isolation and disinfection.	
	Out-breaks.	Cases.	Deaths.	Out-breaks.	Cases.	Deaths.	Out-breaks.	Cases.	Deaths.	Cases.	Deaths.
1900	*1,083	4,405	774	215	1,444	216	170	378	66	2,873	309
Totals 1890-99	6,112	24,761	4,244	939	5,472	798	744	1,469	245	14,314	1,331
Averages, ten years, 1890-99	611	2,476	424	94	547	80	47	147	25	1,431	133
Average cases and deaths per outbreak, 10 years, 1890-99	....	....	....	....	5.82	.85	....	3.13	.53	....	....

* See foot-note to Table 6.

TABLE 15.—*Exhibiting the number of inches of earth above the ground water in Lansing, by months, for the year 1900, compared with the per cent of reported cases and outbreaks of typhoid fever in Michigan, for each month of 1900; also average per cents of the same for the 13 years, 1887-99, and the total numbers of cases and outbreaks included in this table. (Compiled from those cases of which the date of occurrence was given; and for those outbreaks of which the time of beginning was stated.)*

Specifications relative to ground water and typhoid fever.	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	No. of cases and outbreaks included in this table.
Inches of earth above the water, year 1900	.....	324	324	321	324	324	318	319	320	320	324	324	324	....
Per cent of cases of typhoid fever reported, year 1900	100	3	2	2	2	2	5	6	12	21	23	13	8	4,042
Per cent of outbreaks which began in each month, 1900	100	6	2	4	3	3	4	9	14	23	17	8	8	996
Inches of earth above the water, average 1887-99	.....	306	306	304	302	301	299	300	302	304	307	308	308	....
Per cent of cases of typhoid fever reported, average 1887-99	100	4	3	3	3	3	4	6	14	21	21	14	8	27,345
Per cent of outbreaks which began in each month, average 1887-99	100	6	3	3	3	4	6	9	18	19	16	8	5	6,212

TABLE 8.—*Exhibiting, by sex of patient, the duration (in days) of fatal cases of sickness from typhoid fever in Michigan, during the year 1900, and averages for the 13 years, 1887-99. (Compiled from those reports which stated the length of time the patient was sick.)*

Fatal cases of typhoid fever.														
Year.	Sex.	No. of cases included.	Duration of sickness:—Per cent of deaths in each period of days.											
			All cases	Under 11 days.	11 to 15.	16 to 20.	21 to 25.	26 to 30.	31 to 35.	36 to 40.	41 to 45.	46 to 50.	51 to 55.	56 days and over.
1900.	Males	316	100	26	17	17	13	9	4	4	4	2	.9	4
	Females	229	100	29	18	14	11	8	6	3	2	2	.9	5
Av. 1887-1899.	Males	102	100	20	16	17	16	10	6	4	3	3	1	4
	Females	77	100	23	22	15	12	10	6	4	4	1	2	3

TABLE 9.—*Exhibiting, by sex of patient, by per cent of cases which recovered in specified periods of time, the duration (in days) of non-fatal cases of sickness from typhoid fever, in Michigan, during the year 1900, and the averages for the 13 years, 1887-99. (Compiled from those reports which stated the length of time the patient was sick.)*

Non-fatal cases of typhoid fever.														
Year.	Sex.	No of cases included.	Duration of sickness:—Per cent of cases in each period of days.											
			All periods.	Under 11 days.	11 to 15.	16 to 20.	21 to 25.	26 to 30.	31 to 35.	36 to 40.	41 to 45.	46 to 50.	51 to 55.	56 days and over.
1900.	Males	1,170	100	3	5	8	15	18	12	10	7	5	5	11
	Females	918	100	3	5	8	15	19	13	9	8	5	3	11
Av. 1887-1899.	Males	397	100	2	6	8	14	17	14	11	9	6	3	8
	Females	297	100	2	6	9	17	16	14	12	7	4	4	9

TABLE 10.—*Exhibiting, by sex, the per cent of persons in certain age-groups sick from typhoid fever in Michigan, during the year 1900, and the average for the 13 years 1887-99; also the average age and the number of cases included. (Compiled from such reports as stated the ages.)*

Year.	Sex.	Average age of person sick, years.	No. of cases included.	Age.—In periods of years.—Per cent of cases in each period of age.										
				All ages.	Under 10 years.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 years and over.
1900.	Males..........	24	2,024	100	14	12	15	17	12	9	8	5	4	5
	Females	22	1,512	100	18	16	18	14	9	6	6	4	4	6
Av. 1887-1899.	Males..........	23	746	100	15	12	15	20	14	8	6	3	3	4
	Females	21	566	100	18	17	19	14	9	7	5	4	3	5

TABLE 11.—*Exhibiting, by sex, the* **per cent** *of persons in certain age-groups who died of typhoid fever during the year 1900; also for the years 1892-99, the per cent the deaths in each group were of all the deaths from typhoid fever.*

Year.	Sex.	Average age of decedents, years.	No. of deaths included.	Per cent of deaths in certain age-groups.*										
				All. ages.	Under 10 years.	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 years and over.
1900.	Males.....	28	528	100	7	7	14	20	13	11	9	5	5	9
	Females..	26	355	100	12	15	17	16	8	9	5	5	5	9
1892-99.	Per cent the deaths in each age-group were of all the deaths.	......	2,550	100	10	11	15	17	13	9	7	5	4	10

* In each age-group both years are included.

Table 11 shows that of the 528 males and 355 females who died of typhoid fever in 1900, and of whom the ages were reported, the greatest per cent of males were aged from twenty to twenty-four years; and the greatest per cent of females were between fifteen and nineteen years old; and that sixty-one per cent of the males and sixty-eight per cent of the females were under thirty years of age.

Table 11 shows also that the greatest per cent of decedents of both sexes in the eight years 1892-99 died at ages between twenty and twenty-four years.

In studying Tables 10 and 11, and first two lines in Table 12, relative to age of persons who died with or who had typhoid fever, it should be held in mind that there are more persons living in the earlier ages than at the more advanced ages. In the last three lines of Table 12, this fact is taken account of, and they exhibit the relative danger of death at each period of life, according to the experience in Michigan in the eight years 1892-99.

By Table 12 it may be seen, that to males the greater danger of death from typhoid fever was in the age-periods fifteen to twenty-nine years, especially in the period twenty to twenty-four years; the greatest death-rate of females was during the age-period fifteen to nineteen years.

Two lines of evidence of the prevalence of typhoid fever.—In studying the prevalence of typhoid fever in 1900, from the facts presented in the preceding and following pages, it must be borne in mind that those facts are derived from two distinct sources of information:

TABLE 12.—*Exhibiting, by sex, the* **number** *of persons in certain age-groups who died of typhoid fever during the year 1900; also by age-groups, the number of deaths in the eight years, 1892-99, per 10,000 inhabitants.*

Year.	Sex.	Average age of decedents, years.	No. of deaths included.	Number of deaths in certain age-groups.*									
				Under 10 years.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 years and over.
1900.	Males.....	28	528	38	37	76	103	71	56	45	27	27	48
	Females ..	26	355	42	52	59	58	29	31	19	16	16	33
1892-99.	Males.....	Deaths per 10,000 inhabitants of the same sex and age, in each age-group.		.59	1.28	1.98	3.40	2.98	2.09	1.68	1.21	1.38	.98
	Females ..			.56	1.64	2.19	1.75	1.26	1.28	1.23	1.03	.93	.91
1892-99.	The average number of deaths (both sexes) per 10,000 inhabitants in each age-group for the eight years, 1892-99............			.58	1.46	2.08	4.89	2.14	1.71	1.47	1.91	1.17	.94

* In each age-group both years are included.

1.—The numbers of outbreaks, of cases of sickness, and of deaths from typhoid fever are taken from special reports from health officers, during the course of an outbreak, at its close, or in annual reports at the close of the year. If all the people and officers reported as the law provides, the facts presented would represent the *actual numbers* of outbreaks, cases of sickness, and deaths from typhoid fever which occurred in the State during the year; but *all* do not so report. It is just, however, to state that as the people generally are becoming better instructed in the measures recommended by the State Board of Health for the saving of life and health, better and more complete reports are made year by year. So, each year, we believe that an increasing proportion of the cases of sickness and deaths from the dangerous communicable diseases are reported to this office. This tends toward an apparent increase in the prevalence of the disease each year, modified, of course, by the real fluctuation in prevalence. While waiting for perfect reports, the facts derived from those now received are valuable for purposes of study.

TABLE 13.—*For the year 1900, and an average for the 14 years, 1886-99, the per cent of reports (from regular correspondents to the State Board of Health, and others) stating the presence of typhoid fever in Michigan; also, for the same year and period of years, the average number of outbreaks, number of localities of outbreaks, the cases of sickness and the deaths reported from typhoid fever.*

Years.	Per cent of weekly postal reports stating the presence of typhoid fever.	Reported outbreaks of typhoid fever.	Reported localities of outbreaks of typhoid fever.	Reported cases of sickness from typhoid fever.	Reported deaths from typhoid fever.
1900	15	1,113	859	5,122	920
Average 14 years, 1886-99.	10	543	477	2,670	478

2.—The prevalence of typhoid fever, or any given disease, as indicated by the "per cent of reports" is taken from the weekly postal-card reports from regular correspondents of the State Board, health officers of cities and villages, and others. The "per cent of reports" is the per cent of the whole number of reports received which stated the presence of the disease named; it gives the relative prevalence of the disease, under the observation of the physicians who report. It may represent the relative area of prevalence of the disease, combined with the relative number of weeks the disease continued where it did occur, *but not the number of cases.*

The weekly card-reports, however, furnish a valuable means of ascertaining, approximately, the relative prevalence of the several diseases in a given year, and the relative prevalence of a given disease in one year compared with other years, and it is as good a scheme for ascertaining the facts as is yet available. Therefore the sickness statistics based upon those weekly card-reports should be relied upon for a comparison of the relative prevalence of typhoid fever in 1900, compared with preceding years. However, the evidence from the two sources may well be compared.

A comparison of the evidence from the two sources just mentioned, relative to typhoid fever during the years, 1886-1899, is facilitated by Table 13.

TABLE 14.—HEIGHT OF GROUND WATER.—*Inches of earth above the water—by months for the year 1900; also averages for the 14 years, 1886-99, at* **Lansing,** *Mich.,—well in the Capitol grounds.*

Period of time.	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1900	322	324	324	321	324	324	318	319	320	320	324	324	324
Av. 14 years, 1886-99	302	304	304	302	299	299	298	299	301	303	305	307	307

TABLE 15 is on page 167.

TABLE 16.—TYPHOID FEVER IN MICHIGAN.—*Average per cent of weekly card-reports stating the presence of typhoid fever, by months, for 10 years, 1878-87, and in the year 1900; also the average for the 14 years, 1886-99.*

Period of time.	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 10 yrs., 1878-87	10	6	5	4	3	3	5	7	14	18	21	16	10
1900...............	15	6	5	5	6	2	4	11	16	27	33	32	27
Av. 14 yrs., 1886-99	10	7	5	4	3	4	5	7	13	18	20	16	10

TABLE 17.—RAINFALL IN MICHIGAN.—*Average number of inches, by months, for the 10 years, 1878-87, and in the year 1900; also averages for the 14 years, 1886-99.*

Period of time.	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 10 yrs., 1878-87	37.27	2.09	2.89	2.28	2.49	3.52	4.24	3.44	3.21	3.72	3.45	2.98	2.69
1900..........	30.07	1.38	2.92	1.93	1.67	2.99	2.50	4.19	3.23	2.62	2.47	3.39	.78
Av. 14 yrs., 1886-99	31.32	2.47	2.08	2.12	2.34	3.53	3.08	2.40	2.60	2.87	2.58	2.86	2.40

TABLE 18.—TEMPERATURE OF THE WATER *in the well at the State Capitol in* **Lansing,** *Mich., by months for the year 1900; also averages for the 14 years, 1886-99.*

Year and period of years.	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1900	21	*0	0	48	0	0	50	51	53	53	0	0	0
Av. 14 years, 1886-99..	49	47	45	48	48	49	46	46	47	48	44	45	47

* In January, February, April, May, October, November and December there was no water in the well.

TABLE 19.—*Sickness from typhoid fever in Michigan (as indicated by the weekly card-reports by all observers) and the depth of earth (in inches) above the water in the well, and the temperature of the water in the well at* **Lansing,** *Michigan, averages by year and months for the 14 years, 1886-99.*

	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Sickness from typhoid fever*........	10	7	5	4	3	4	5	7	13	18	20	16	10
Inches of earth above water in well†.......	302	304	304	302	299	299	298	299	301	303	305	307	307
Temperature of water in well‡.......	49	47	45	48	48	49	46	46	47	48	44	45	47

* Per cent of all reports received (from observers in different parts of the State) which stated the presence of typhoid fever, from last line in Table 16.

† This line is copied from the last line in Table 14.

‡ This line is copied from the last line in Table 18.

TABLE 20.—*Exhibiting the average total annual rainfall at stations in Michigan, the same for Lansing, the inches of earth above the ground water at* **Lansing,** *the inches of water in an undisturbed well at Lansing, and the reported sickness, from typhoid fever in Michigan, as indicated by the per cent of all the weekly card-reports which stated the presence of typhoid fever, during the year, 1900, and averages for the 14 years, 1886-99.*

Year, and period of years.	Average total annual rainfall at stations in Michigan, in inches.	Total annual rainfall at Lansing, in inches.	Inches of earth above the ground water at Lansing.	Inches of water in an unused well at Lansing.	Ground water higher (+) or lower (—) than the 14 years average, in inches.	Average per cent of all weekly card-reports stating the presence of typhoid fever.	More (+) or less (—) sickness from typhoid fever than the 14 years average.
1900..................	30.07	33.29	322	2	—20	15	+5
Av. 14 years, 1886-99	30.88	29.93	302	22	....	10	....

SCARLET FEVER IN MICHIGAN.—YEAR ENDING DECEMBER 31, 1900.

During the year ending December 31, 1900, there were reported to the Secretary of the State Board of Health 850 outbreaks of scarlet fever in 647 localities in Michigan, which resulted in 6,734 cases,* including 306 deaths.

The average numbers of cases of sickness and of deaths per outbreak, in 1900, were 7.92 cases, including .36 deaths. The fatality, i. e., the proportion of reported cases which proved fatal, was 4.5 per 100 cases.

Scarlet fever in 1900, compared with previous years.—From year to year there has been a steady improvement, both in the methods adopted by the State Board of Health in securing and compiling reports, and in the efforts made by local health authorities throughout the State to furnish in their reports the information desired by the State Board. These facts, together with the constantly increasing population, make it difficult to determine the exact increase or decrease of prevalence of the disease in the State by comparison of the numbers of outbreaks of the disease, and the cases and deaths resulting therefrom, and this should be borne in mind in studying Table 1. It might reasonably be expected that these facts will produce a constant increase in the reported prevalence of the disease.

TABLE 1.—SCARLET FEVER IN MICHIGAN.—*Numbers of reported outbreaks, localities (in which they occurred), cases and deaths; average numbers of cases and deaths per outbreak, and the per cent of cases which proved fatal, as reported for the years 1899 and 1900, with the departures of the same for 1900 from 1899 and from the averages of the same for the 16 years, 1884-99.*

Year.	Reported outbreaks.	Reported localities.	Reported cases.*	Av. No. of cases per outbreak.	Reported deaths.	Av. No. of deaths per outbreak.	Deaths per 100 cases.
1899................	655	503	4,345	6.63	171	.26	3.9
1900	850	647	6,734	7.92	306	.36	4.5
Departures of 1900 from 1899........	+195	+144	+2,389	+1.29	+135	+.10	+.6
Average for sixteen years, 1884-99......	482	404	3,917	8.14	220	.46	5.6
Departures of 1900 from the averages for 16 years, 1884-99	+368	+243	+2,817	—.22	+86	—.10	—1.1

For 1900 there were reported 2,389 cases, including 135 deaths, more than there were reported for 1899.

While there were reported in 1900, 368 more outbreaks and in 243 localities more than the annual averages for the sixteen years preceding, the average numbers of cases and deaths *per outbreak* were slightly less in 1900.

Table 1, and comments thereon are based upon reports to the office of the State Board of Health. Exhibit 1, Diagram 1, and comments thereon are based upon returns of deaths, made to the Secretary of State. For all years preceding 1898 the statistics of deaths were collected after the close of the year in which they occurred; for all years after 1897 the deaths were recorded before burial, and returns were made to the Secretary of State early in the following month. There is reason to believe that under the new law nearly all deaths are included in the statistics, whereas, before 1898 a considerable proportion was omitted. This fact should be held in mind in comparing the deaths reported for the year 1900 with those reported in years previous to 1898.

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* Throughout this article, "cases" include deaths, unless the word non-fatal is used.

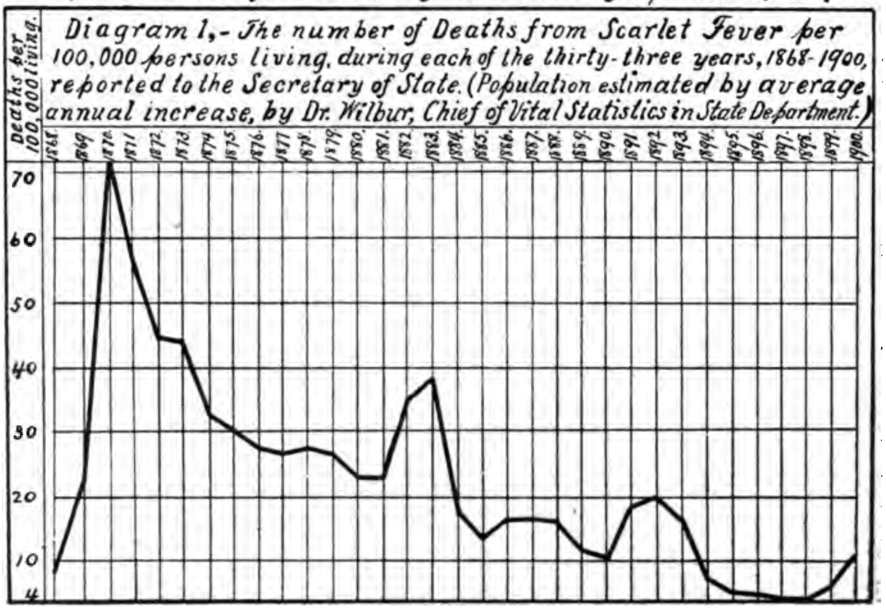
EXHIBIT 1.—*Exhibiting the reported number of deaths from scarlet fever in Michigan per 100,000 population for each of the 33 years, 1868-1900. (The data for this table were supplied by C. L. Wilbur, M. D., Chief of Vital Statistics of Michigan, Department of the Secretary of State.)*

Year.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.
Death rate.....	8.48	22.09	71.96	56.62	44.33	43.94	32.23	29.99	27.41	26.91	27.74	26.26	22.66	22.82

Year.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.
Death rate.	34.25	37.94	17.91	13.13	16.69	16.25	16.13	11.72	10.60	18.70	20.23	16.30	7.27	5.09	4.58

Year.	1897.	1898.	1899.	1900.
Death rate.	4.0	3.9	6.0	11.2

Reported Deaths from Scarlet fever in Michigan, 33 Years, 1868-1900.



[PLATE 1110]

TABLE 2.—*Numbers of cases and deaths reported from scarlet fever, and the cases and deaths per 10,000 persons living in each county in Michigan during the year 1900. (Compiled from reports of health officers.)*

State and counties.	Population of Michigan for 1900.	Number of reported		Number per 10,000 population, of	
		Cases.*	Deaths.	Cases.	Deaths.
State	2,420,982	6,734	306	27.82	1.26
Alcona	5,691	0	0	0	0
Alger	5,868	1	0	1.70	0
Allegan	38,812	96	0	24.73	0
Alpena	18,254	6	1	3.29	.55
Antrim	16,568	79	8	47.68	4.83
Arenac	9,821	32	1	32.58	1.02
Baraga	4,320	1	0	2.31	0
Barry	22,514	33	1	14.66	.44
Bay	62,378	560	31	89.78	4.97
Benzie	9,685	0	0	0	0
Berrien	49,165	155	7	31.53	1.42
Branch	27,811	50	3	17.98	1.08
Calhoun	49,315	105	4	21.29	.81
Cass	20,876	61	0	29.22	0
Charlevoix	13,956	80	1	57.32	.72
Cheboygan	15,516	49	2	31.58	1.29
Chippewa	21,338	13	0	6.09	0
Clare	8,360	1	0	1.20	0
Clinton	25,136	68	1	27.05	.40
Crawford	2,943	62	2	210.67	6.80
Delta	23,881	67	8	28.06	3.35
Dickinson	17,890	77	6	43.04	3.35
Eaton	31,668	68	3	21.47	.95
Emmet	15,931	10	0	6.28	0
Genesee	41,804	70	0	16.74	0
Gladwin	6,564	7	1	10.66	1.52
Gogebic	16,738	61	5	36.44	2.99
G'd Trav'se	20,479	102	3	49.81	1.46
Gratiot	29,889	61	2	20.41	.67
Hillsdale	29,865	27	0	9.04	0
Houghton	66,063	784	68	118.67	10.29
Huron	34,162	104	7	30.44	2.05
Ingham	39,818	217	4	54.50	1.00
Ionia	34,329	57	0	16.60	0
Iosco	10,246	4	0	3.90	0
Iron	8,990	18	1	20.02	1.11
Isabella	22,784	41	0	18.00	0
Jackson	48,222	28	0	5.81	0
Kalamazoo	44,310	171	3	38.59	.68
Kalkaska	7,133	82	0	114.96	0
Kent	129,714	508	13	39.16	1.00
Keweenaw	3,217	28	5	87 04	15.54
Lake	4,957	12	0	24.21	0
Lapeer	27,641	130	3	47.03	1.09
Leelanau	10,556	25	2	23.68	1.89
Lenawee	48,406	142	4	29.34	.83
Livingston	19,664	31	0	15.76	0
Luce	2,983	0	0	0	0
Mackinac	7,703	5	1	6.49	1.30
Macomb	33,244	39	1	11.73	.30
Manistee	27,856	165	6	59.23	2.15
Marquette	41,239	225	14	54.56	3.39
Mason	18,885	12	0	6.35	0
Mecosta	20,693	14	0	6.77	0
Menominee	27,046	1	1	.37	.37
Midland	14,439	65	5	45.02	3.46
Missaukee	9,308	27	4	29.01	4.30
Monroe	32,754	70	4	21.37	1.22
Montcalm	32,764	67	0	20.46	0
Montmorency	3,234	23	1	71.12	3.09
Muskegon	37,036	16	1	4.32	.27
Newaygo	17,673	5	0	2.83	0
Oakland	44,792	54	1	12.06	.22
Oceana	16,644	38	1	22.83	.60
Ogemaw	7,765	5	1	6.44	1.29
Ontonagon	6,197	11	0	17.75	0
Osceola	17,859	13	1	7.28	.56
Oscoda	1,468	16	3	108.99	20.44
Otsego	6,175	23	3	37.25	4.86
Ottawa	39,667	58	3	14.62	.76
Presque Isle	8,821	14	1	15.87	1.13
Roscommon	1,787	1	0	5.60	0
Saginaw	81,222	91	3	11.20	.37
Sanilac	35,055	22	1	6.28	.29
Schoolcraft	7,889	85	6	107 74	7.61
Shiawassee	33,866	55	4	16.24	1.18
St. Clair	55,228	77	2	13.94	.36
St. Joseph	23,889	90	0	37.67	0
Tuscola	35,890	179	7	49.87	1.95
Van Buren	33,274	114	4	34.26	1.20
Washtenaw	47,761	100	1	20.94	.21
Wayne	348,793	496	23	14.22	.66
Wexford	16,845	74	3	43.93	1.78

* Includes deaths from scarlet fever.

Sickness-rates, by counties, from reported scarlet fever.—Table 2 shows that the greatest sickness-rate from reported scarlet fever, by counties, was in Crawford county, where the ratio of cases to population was 210.67 to 10,000. This was over seven times the average rate for the State. Houghton county had the next highest sickness-rate, 118.67 cases per 10,000 population. The two counties adjoining Crawford county, Kalkaska, with 114.96 cases, and Oscoda, with 108.99 cases, per 10,000 population, were next in order of high sickness-rates. Oscoda county had high sickness-rates for the past two years,—111.24 cases per 10,000 population, in 1898, and 83.18 cases, in 1899. Sickness from scarlet fever was reported from all counties but three, Alcona, Benzie, and Luce.

While there has been a steady improvement in reporting cases of scarlet fever, it is probable that there are cases of light forms of the disease, requiring no physician, that are not reported. Consequently the reports of cases of scarlet fever are not as complete as the reports of deaths from this disease, yet comparisons may be made, subject to the mental reservation that not all cases are reported, and that the omissions may be greater in some parts of the State than in others.

Death-rates, by counties, from reported scarlet fever.—Table 2 shows that the greatest death-rate from reported scarlet fever, 20.44 deaths per 10,000 population, was in Oscoda county. With the exception of Keweenaw county, with 15.54 deaths, and Houghton, with 10.29 deaths, per 10,000 population, this rate was nearly three times the death-rate for any other county. Oscoda county also had the highest death-rate in 1899,—11.88 deaths per 10,000 population. The death-rates are now believed to be fairly accurate.

From twenty-three counties, from which an aggregate of 735 cases of scarlet fever were reported, there were no deaths reported from this disease. The lowest death-rate, in counties from which deaths from this disease were reported, was in Washtenaw county. This county had .21 of one death per 10,000 population.

Fatality, by counties, from reported scarlet fever.—The fatality from reported scarlet fever in 1900 was, for the whole State, 4.5 per cent, or about one death to twenty-two cases. In Menominee county the only case reported proved fatal. In each of the two counties, Mackinac and Ogemaw, twenty per cent of reported cases were fatal cases. The lowest fatality in counties from which deaths from scarlet fever were reported, one death per 100 cases, occurred in Washtenaw county.

Distribution of scarlet fever in cities, villages and townships.—From the data in Table 3 it may be observed that 87 per cent of the cities, 42 per cent of the villages, and 37 per cent of the townships, were infected with scarlet fever. But the average population of the cities is over thirteen times the average population of the villages.* The highest case-rate (37.24) and death-rate (2.36) occurred in the villages.

Scarlet fever in each month of the year 1900.—The last line of figures in Table 4, representing the reported number of outbreaks present, is not derived from the preceding two lines, as might be supposed, but is obtained by actual count of the number of outbreaks reported as existing in each month. Frequently the beginning of an outbreak is reported but the end of the outbreak is not reported; and sometimes the month in which the outbreak ended is given without giving the date of the beginning of the outbreak. (Thirty-four of the outbreaks reported as having ended in January, and five of the outbreaks reported as having ended in February, were outbreaks which began the preceding year, and in which there were no new cases reported in 1900.) In either case the outbreak may have begun and ended in the same month, or it may have extended through several months. There were ninety-four more beginnings than endings of outbreaks reported during the year 1900.

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* The average population of the cities is 12,048, of the villages, 902, and of the townships, 1,000.

TABLE 3.—*Exhibiting the numbers of outbreaks and cases of and deaths from scarlet fever which occurred in the cities, villages and townships of Michigan in 1900, and the comparative numbers of outbreaks, cases, deaths, and fatality from this disease in cities, villages, and townships. (Compiled from reports of local health officials to the Secretary of the State Board of Health.)*

Classes of political divisions.	Population.	Health jurisdictions.	Outbreaks in:			Cases.*	Deaths.	Fatality. (Per cent cases of deaths.)	Rates per 10,000 population.	
			Localities.							
			No. of.	Per cent of all localities.	No. of.				Cases.	Deaths.
State (83 counties)............	2,420,982	1,589	647	41	850	6,734	306	4.5	27.82	1.26
Cities............................	939,759	78	68	87	103	2,621	96	3.7	27.89	1.02
Villages..........................	275,251	305	129	42	158	1,025	65	6.3	37.24	2.36
Townships........................	1,205,972	1,206	450	37	589	3,088	145	4.7	25.61	1.20

* Includes deaths.

TABLE 4.—*Exhibiting the reported number of outbreaks of scarlet fever which began, the number which ended, and the number which were present, in each month of the year 1900, in the different local jurisdictions of Michigan.*

Outbreaks.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Number began.....	89	43	50	56	56	44	55	52	56	81	89	83	754
Number ended.....	62	52	61	51	56	58	44	40	38	45	61	92	660
Number present...	199	177	174	167	168	153	146	151	158	193	228	238	....

The second line of figures in Table 5 shows the per cent the localities infected in each month are of the exact number of localities (647) *reported* to this office for the year 1900.

The third line of figures in Table 5 shows the number of cases reported sick in any part of each month.

As some of the cases were sick longer than one month they are included in the cases sick in more than one month, therefore the sum of the cases sick in all the months exceeds the total of reported cases in 1900.

The fourth and last lines of figures in Table 5 show the per cent the cases present and the per cent the cases taken sick, in each month, are of the exact number of cases (6,734) *reported* to this office for the year 1900.

TABLE 5.—*Exhibiting the number and per cent of localities infected with scarlet fever, and the number and per cent of cases of scarlet fever present, and the number and per cent of cases taken sick, in Michigan, in each month during the year 1900.*

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Localities, number.........	196	175	172	167	167	152	146	149	156	191	224	235
Per cent....................	30.3	27.0	26.6	25.8	25.8	23.5	22.6	23.0	24.1	29.5	34.6	36.3
Cases present, number.....	612	674	667	559	700	688	569	515	592	917	1,096	1,139
Per cent....	9.1	10.0	9.9	8.3	10.4	10.2	8.4	7.6	8.8	13.6	16.3	16.9
Cases taken sick............	514	408	422	364	461	408	348	310	438	637	716	737
Per cent....................	7.6	6.1	6.3	5.4	6.8	6.1	5.2	4.6	6.5	9.5	10.6	10.9

Source of contagium of scarlet fever, how the disease is spread, and the vitality of the contagium.—Of the 6,734 cases of scarlet fever reported during the year 1900, the local health officers reported the source of contagium, as follows: Traced to a former case, 1,105; probably traced to a former case, 12; attributed to infected houses, articles, clothing, etc., 28; source of contagium unknown, 3,692; source of contagium not stated, 1,738; traced to an outside jurisdiction, 120; probably from an outside jurisdiction, 39.

The germ of scarlet fever is not yet demonstrated; but that there is a germ seems to be proved by the known communicability of the disease.

Reports of health officers and physicians indicate that the scarlet fever germ frequently retains its vitality for a long time outside of the human body, in an apparently dormant or inactive state, in houses, clothing, carpets, furniture, etc., and is then capable of developing scarlet fever in persons coming into such houses or in contact with or near such articles, thus showing the importance of carefully disinfecting all infected houses and articles, even where they are are not to be used for a long time.

The following quotations are from a few of such reports sent to this office:—

"Infected by playing with a doll previously used by a girl sick with scarlet fever."—*Chas. M. Steele, M. D., Clyde township, Allegan county.*

"From playing in a house where disease was twelve or fourteen years ago."—*O. F. Burroughs, Jr., M. D., Gun Plains township, Allegan county.*

"Tearing wall paper from wall where the disease had been eighteen years ago."—*O. F. Burroughs, Jr., M. D., Plainwell village, Allegan county.*

"Handling books brought in by pupil who had scarlet fever year previous."—*Geo. A. Goddard, Ellis township, Cheboygan county.*

"From a house where disease was nearly one year ago. House disinfected too soon."—*Robert B. Sutton, Dover township, Lenawee county.*

"From a book played with by a child who had scarlet fever several years ago."—*Chas. B. Long, M. D., Mendon township, St. Joseph county.*

Movements of contagium of scarlet fever.—Table 6, "Movements of contagium," shows the sources and directions of movements of scarlet fever in Michigan, where the contagium was reported by health officers to have been introduced into their jurisdictions from localities outside the State, or from other jurisdictions within the State.

TABLE 6.—*First, second and third localities, where the second locality was infected with scarlet fever from the first, and the third was infected from the second; and the number of cases and deaths from scarlet fever in the first, second and third localities with the dates of the beginning and ending of each outbreak. (Compiled from reports of health officers who were able to trace the source of the contagium to other localities.)*

First localities from which scarlet fever was spread.			Second localities infected from first.			Third localities infected from second.		
Localities.	Cases.*	Deaths.	Localities.	Cases.*	Deaths.	Localities.	Cases.	Deaths.
Allegan county: Cheshire township...... (July 13-Sept. 21.)	4	0	Allegan county: Saugatuck township... (July 27-Sept. 5)	3	0			
Allegan county: Hopkins township...... (July 15-Sept. 29.)	4	0	Ottawa county: Jamestown township.. (Nov. ——.)	1	0			
Allegan county: Otsego village.......... (Sept.-Oct.)	6	0	Kalamazoo county: Alamo township....... (Oct. 18-Nov. 16.)	3	0			
Allegan county: Saugatuck† (village).... (Mar. 6-Nov. 24.)	11	0	Allegan county: Douglas village........ (May 17-May 25.)	1	0			
Allegan county: Valley township........ (Oct. 9-Nov. 25.)	4	0	Allegan county: Allegan township...... (Oct. 31-Nov. 16.)	1	0			
Antrim county: Central Lake village... (June 26-Aug. 10.)	14	1	Antrim county: Torch Lake township.. (July 5-Sept. 17.)	3	0			
Antrim county: Central Lake† (village).. (Jan.-Mar. 17.)	10	2	Leelanau county: Glen Arbor township.. (April 5-Dec. 12.)	8	0			
Antrim county: Echo township.......... (Jan.-May 26.)	16	0	Antrim county: Jordan township....... (Jan.-Mar. 10.)	6	1			
Arenac county: Adams township........ (Jan.-Feb. 5.)	7	0	Arenac county: Standish village....... (Jan. 3-Feb. 5.)	3	0	Bay county: Gibson township.... (Feb. 13 ——.)	1	0
Arenac county: Turner township........ (July 25-Aug. 5)	2	1	Arenac county: Clayton township...... (Oct.-Nov. 13.)	1	0			
			Mason township..	3	0	Arenac county: Clayton township....	5	0
Baraga county: L'Anse township.......	‡	....	Marquette county: Michigamme township (Mar. 16-April 7.)	4	0			
Barry county: Hope township......... (Oct. 7 ——.)	2	0	Barry county: Barry township........ (Dec. 4-Dec. 20.)	1	0			
Bay county: Bay City................. (Jan. 3-Dec. 31.)	293	13	Bay county: Bangor township...... (July 24-Nov.)	7	1			
			Merritt township...... (Sept. 2-Nov. 6.)	3	0			
			Portsmouth township. (Sept. 21-Oct.24.)	4	0			
			West Bay City......... (Jan. 15-Dec. 31.)	137	8			
			Crawford county: Grayling township..... (Oct. 12-June 29, 1901.)	43	1			

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* Includes deaths.

† Health officer of second locality did not report whether it was village or township.

‡ Scarlet fever was not reported to this office by the health officer of the "first" locality at the time it was said to have spread from there, showing that the disease, if present, was neglected; probably it was not reported to the health officer as the law requires.

TABLE 6.—CONTINUED.—*Movement of infection of scarlet fever.*

First localities from which scarlet fever was spread.			**Second** localities infected from first.			**Third** localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Bay county: Gibson township (Sept. 12-Jan. 14, 1901.)	19	0	Bay county: Mt. Forest township (Sept. 5-Sept. 21.)	4	0			
Berrien county: Bainbridge township (Feb. 21 —.)	15	0	Cass county: Silver Creek township. (May 3-June 2.)	3	0			
Berrien county: Benton Harbor city (Nov. 29-Mar. 16, 1901.)	13	1	Mecosta county: Big Rapids city (Dec. 29-Jan. 18, 1901.)	3	0			
Berrien county: St. Joseph township	2	0	Berrien county: Benton township	9	1			
Branch county: Butler township (Jan.-Mar. 19.)	6	0	Calhoun county: Clarendon township (Jan. 16-April 6.)	1	1			
Branch county: Union City village (April 30-Aug. 22.)	12	1	Hillsdale county: Scipio township (July 6-July 20.)	1	0			
Calhoun county: Battle Creek city (Mar.-Dec.)	59	3	Barry county: Barry township	3	0			
			Maple Grove township (May 24-June 25.)	1	0			
			Calhoun county: Burlington township	1	0	Branch county: Girard township	6	0
			LeRoy township (Sept. 16-Sept. 29.)	1	0			
Calhoun county: Bedford township	2	0	Kalamazoo county: Ross township (Feb. 19-March 20.)	1	0			
Cass county: Dowagiac city (Jan.-Feb. 23, 1901.)	47	0	Berrien county: Watervliet village (Dec. 7-Feb. 24, 1901.)	5	0			
			Cass county: Pokagon township (April 6-April 17.)	4	0	Cass county: Volinia township	2	0
Charlevoix county: East Jordan village (Jan.-Oct. 15.)	16	0	Kalkaska county: Rapid River township. (Jan. 14-April 10.)	9	0			
Charlevoix county: Hayes township	‡	....	Charlevoix county: Charlevoix township (July 12-Aug. 9.)	1	0			
			Marion township (Mar. 2 —.)	4	0			
Cheboygan county: Cheboygan city (Jan. 1-Dec. 31.)	40	1	Cheboygan county: Ellis township (Aug. 23-Sept. 28.)	1	0			
Clare county: Redding township	‡	....	Missaukee county: McBain village (Dec. 28-Jan. 12, 1901.)	3	0			
Delta county: Escanaba city (— Jan. 7.)	6	0	Delta county: Bark River township	1	0			
Eaton county: Grank Ledge city (Sept. 10-Nov. 2.)	15	0	Eaton county: Roxand township (Oct. 23-Jan., 1901.)	3	0			

‡ This foot-note is printed at the bottom of the first page of this table.

TABLE 6.—CONTINUED.—*Movement of infection of scarlet fever.*

First localities from which scarlet fever was spread.			Second localities infected from first.			Third localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Genesee county: Clio village	‡	....	Genesee county: Thetford township (Nov. 7-Mar. 8, 1901.)	4	0			
Genesee county: Flint city (Jan.-Dec. 9.)	32	0	Genesee county: Flint township (Mar. 7-April.)	2	0			
			Shiawassee county: Vernon township (Mar. 15-Mar. 30.)	1	0			
Genesee county: Flushing† (village) (April 20-Sept. 14.)	8	0	Saginaw county: Taymouth township (July 20-Sept. 29.)	5	0			
Gladwin county. Gladwin city	‡	....	Gladwin county: Gladwin township (June 26-June 30.)	1	0			
Grand Traverse county: Fife Lake village (Nov. 10-Dec. 10.)	10	0	Grand Traverse county: Paradise township (Dec.-May, 1901.)	12	3			
			Montcalm county: Belvidere township	3	0			
Gratiot county: Elba township	‡	....	Gratiot county: North Star township (Nov. 1-Nov. 15.)	1	0			
Gratiot county: Sumner township	‡	....	Clinton county: Ovid village (Sept. 25-Oct. 5.)	2	1			
			Gratiot county: Seville township (Jan. 1-April 10.)	6	0			
Houghton county: Laurium village (Jan.-Feb. 24, 1901.)	107	10	Houghton county: Torch Lake township (March 25-April 19.)	2	1			
Huron county: Brookfield township (June ——.)	5	0	Huron county: Grant township (Nov. 23-Dec. 8.)	4	0			
Huron county: Fair Haven township	9	0	Huron county: Bad Axe village (Oct. 3-Oct. 31.)	4	3			
Huron county: Winsor township (Jan. 13-Feb.)	2	0	Tuscola county: Akron township (April 11-April 25.)	1	0			
Huron county: Winsor township	7	0	Huron county: Grant township (Aug. 29-Sept. 25.)	1	0			
			Tuscola county: Columbia township (Aug. 1-Sept. 20.)	2	0			

† Health officer of second locality did not report whether it was village or township.

‡ This foot-note is printed at the bottom of the first page of this table.

TABLE 6.—CONTINUED.—*Movement of infection of scarlet fever.*

First localities from which scarlet fever was spread.			Second localities infected from first.			Third localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Ingham county: Lansing city (Jan.-Dec.)	165	1	Eaton county: Chester township (Dec. 31-1901.)	2	0			
			Delta township (Oct. 29-Nov. 5.)	1	0			
			Shiawassee county: Owosso city (July 22-Aug. 3.)	1	0			
			Woodhull township (Jan.-Feb. 12.)	4	0			
Ionia county: Lake Odessa village (Sept.-Oct.)	6	0	Barry county: Woodland township (Oct. 19-Nov. 18.)	6	1			
			Eaton county: Sunfield township (Oct. 22-Nov. 17.)	3	0			
Isabella county: Coe township (Jan.-May 18.)	13	0	Gratiot county: Pine River township (Mar. 26-May 19.)	4	0			
Jackson county: Columbia township (Nov. 28-Dec. 14.)	2	0	Lenawee county: Woodstock township (Nov. 25-Dec. 15.)	2	1			
Jackson county: Jackson city (Jan. 23-July 17.)	15	0	Berrien county: Niles city (April 1-April 23.)	1	0			
			Jackson county: Hanover township (Feb. 16-Mar. 22.)	4	0			
Kalamazoo county: Kalamazoo city (Jan. 3-Dec. 31.)	125	0	Allegan county: Watson township (May 25-June 12.)	20	0			
			Ottawa county: Holland city (May 8-June 1.)	2	0			
			Van Buren county: Pine Grove township (April 12-May 5.)	1	0			
Kalamazoo county: Vicksburg village (Nov. 3-April, 1901.)	19	1	Kalamazoo county: Brady township (Nov. 27-Feb., 1901.)	6	0	Kalamazoo county: Schoolcraft twp (Nov. —.)	4	0
						Vicksburg village§ (Nov.-April, 1901.)	19	1
Kalkaska county: Boardman township (Jan. 4 —.)	1	0	Grand Traverse county: Kingsley village (April 5-April 30.)	4	0			
Kalkaska county: Kalkaska village (Jan.-June 10.)	5	0	Kalkaska county: Wilson township (May 15-June 9.)	5	0			
Keweenaw county: Allouez township (Oct. 17-Dec. 20.)	16	3	Keweenaw county: Houghton township (Nov. 18-Dec. 3.)	1	0			
Kent county: Caledonia village (Jan. 20-April 17.)	5	1	Kent county: Caledonia township (March 16-April 1.)	1	0			
Kent county: Courtland township	1	1	Kent county: Algoma township (Jan. 12-May 15.)	9	0			

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§ From Vicksburg village, Kalamazoo county, 19 cases and 1 death, spread to Brady township, Kalamazoo county, 6 cases, and to Mendon village, St. Joseph county, 6 cases.

TABLE 6.—CONTINUED.—*Movement of infection of scarlet fever.*

First localities from which scarlet fever was spread.			Second localities infected from first.			Third localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Kent county: Grand Rapids city (Jan.-Dec. 31.)	351	7	Allegan county: Watson township (Aug. 2-Oct. 29.)	20	0			
			Charlevoix county: Boyne City village (Aug. 31-Nov. 22.)	2	0			
			Kent county: Cascade township (Aug. 19-Nov. 17.)	17	0			
			Gaines township (Oct. 22 ——.)	4	0			
			Paris township (Oct. 1-Oct. 10.)	3	0			
Lapeer county: North Branch village (April 13-June 5.)	35	0	Lapeer county: Burlington township (May 4-May 24.)	3	1			
			North Branch township (May ——.)	20	0			
			Sanilac county: Marlette village (May 12 ——.)	1	0			
Lenawee county: Adrian city	10	0	Lenawee county: Adrian township (Jan. 8 ——.)	1	0			
Lenawee county: Rome township (Jan. 9-June 12.)	4	0	Lenawee county: Adrian township (Feb. 17-March 3.)	1	0			
Mackinac county: Garfield township	‡	....	Mackinac county: St. Ignace city (July 14-Aug. 20.)	2	0			
Macomb county: Memphis village (Jan.-April 10.)	9	0	Macomb county: Richmond township (Feb. 5-Feb. 9.)	1	1			
			St. Clair county: Riley township (March 1-March 5.)	1	1			
Macomb county: Washington township (Jan. 8-Jan. 18.)	1	0	Lapeer county: Almont village	3	0	Lapeer county: Almont township	1	0
Manistee county: Filer township.	‡	....	Manistee county: Manistee city (Jan. 5-Mar. 1.)	8	0			
Manistee county: Manistee city (June 10-Jan., 1901.)	152	5	Manistee county: Brown township (Dec. 25-Mar. 12, 1901.)	3	0			
			Maple Grove township (July 15-Sept. 5.)	1	0			
Mason county	....	....	Oceana county: Leavitt township (Mar. 11-May 20.)	10	1			
Midland county: Lincoln township	1	0	Midland county: Midland city (Aug. 1-Sept. 18.)	7	2			
Montcalm county: Carson City	9	0	Ingham county: Webberville village	2	0			
Montcalm county: Pierson township (Jan. 10-Feb. 10.)	3	0	Montcalm county: Howard City village (Feb. 2-Mar. 4)	3	0			

‡ This foot-note is printed at the bottom of the first page of this table.

TABLE 6.—CONTINUED.—*Movement of infection of scarlet fever.*

First localities from which scarlet fever was spread.			Second localities infected from first.			Third localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Montcalm county: Winfield township...... (Jan. 21-Feb. 15.)	2	0	Montcalm county: Howard City village... (Mar. 18-April 25.)	4	0	Montcalm county: Pierson township....	14	0
Montmorency county....	....	....	Oscoda county: Comins township...... (Oct. 17-Nov. 20.)	7	1			
Montmorency county: Albert township........ (Mar. 10-July 27.)	17	0	Oscoda county: Elmer township......... (May 24-June.)	2	0			
Newaygo county.........	....	....	Van Buren county: Breedsville village.... (Dec. 19-Dec. 31.)	1	0			
Oakland county: Birmingham............	‡	....	Barry county: Carlton township...... (Dec. 3-Jan. 2, 1901.)	4	0			
Oakland county: Pontiac city............ (Mar. 10-Nov. 12.)	19	0	Oakland county: West Bloomfield tp.... (May 10-Oct. 1.)	3	0			
Oakland county: Royal Oak village....... (Oct. 17-Mar. 17, 1901.)	11	0	Oakland county: Royal Oak township... (Nov. 7-Dec. 16.)	5	1			
Oceana county: Elbridge township...... (Nov. ——.)	2	0	Oceana county: Leavitt township...... (Nov. 27-Jan. 19, 1901.)	9	0			
Ontonagon county: Rockland township..... (June-July.)	1	0	Gogebic county: Ironwood city..........	80	5			
Otsego county: Gaylord village......... (Jan.-Jan.)	2	0	Otsego county: Corinth township...... (Feb. 11-May 23.)	12	0			
			Crawford county: Maple Forest township	1	0			
Ottawa county: Holland city............ (Jan.-Jan. 20.)	3	0	Allegan county: Saugatuck village..... (Jan. 11-Feb. 12.)	2	0			
Presque Isle county: Onaway village......... (—— 1901.)	12	2	Presque Isle county: Allis township......... (Oct. 20-Oct. 30.)	2	0			
Saginaw county: Saginaw city............ (Sept. 1-Jan. 6, 1901.)	16	1	Arenac county: Whitney township..... (Nov. 7-Nov. 16.)	2	0			
			Charlevoix county: Charlevoix village..... (Dec. 16-Dec. 23.)	1	0	Emmet county: Petoskey city......... (Dec. 28-Jan. 11, 1901.)	3	0
Schoolcraft county: Manistique (village).... (Jan.-July 27, 1901.)	85	9	Schoolcraft county: Harrison township.... (Aug. ——.)	1	0			
Shiawassee county: Owosso city............. (Oct. 6-Jan. 12, 1901.)	14	0	Muskegon county: North Muskegon city.. (Nov. 1-Nov. 21.)	1	0			
Shiawassee county: Venice township........ (Aug. 20-Jan. 20, 1901.)	10	1	Shiawasssee county: Corunna city........... (Sept. 2-Dec.)	2	0			

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‡ This foot-note is printed at the bottom of the first page of this table.

TABLE 6.—CONTINUED.—*Movement of infection of scarlet fever.*

First localities from which scarlet fever was spread.			**Second** localities infected from first.			**Third** localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
St. Joseph county: Mendon† (village) (Dec. 25-Mar. 11, 1901.)	6	0	Kalamazoo county: Brady township (Dec. ——.)	1	0			
Tuscola county	....	....	Bay county: Merritt township (Nov. 25-Dec. 24.)	1	0			
Tuscola county: Fremont township (Oct. 4-Feb. 23, 1901.)	18	1	Tuscola county: Mayville village (March 3 ——.)	5	0			
Tuscola county: Millington village (March 3 ——.)	5	0	Tuscola county: Millington township (Sept. 12 ——.)	7	0	Oakland county: Brandon township (Dec. 17 ——.)	2	0
Tuscola county: Unionville village	‡	....	Grand Traverse county: Traverse City	51	0	Gd. Traverse county: Blair township (June-July.)	2	0
Tuscola county: Vassar township (May 12-June 26.)	2	0	Tuscola county: Fremont township (May 26-June.)	3	0			
Tuscola county: Watertown township (Jan. 26-Aug. 14.)	8	0	Lapeer county: Deerfield township (July ——.)	15	0			
Tuscola county: Wells township (May 27-June 15.)	1	0	Tuscola county: Indianfields township (—— June.)	3	0			
Van Buren county: Bangor township	‡	....	Van Buren county: South Haven township (Nov. 25-April, 1901.)	1	0			
Van Buren county: Bloomingdale township (July 30-Aug. 15.)	1	0	Van Buren county: Almena township (Sept. 1-Sept. 30.)	2	0			
Van Buren county: Covert township (Aug.-1901.)	46	1	Berrien county: Watervliet township (Dec. 10-Jan. 1, 1901.)	1	0			
			Cass county: LaGrange township (Dec. 25-Feb. 14, 1901.)	4	0			
Washtenaw county	....	....	Livingston county: Pinckney village (May-Nov.)	18	0			
Washtenaw county: Chelsea village	‡	....	Washtenaw county: Lyndon township (Jan. 10-Mar. 10.)	2	0			
Washtenaw county: Manchester township	‡	....	Lenawee county: Franklin township (June 2-July 7.)	1	0			
Washtenaw county: Salem township	‡	....	Washtenaw county: Northfield township (July 2-July 20.)	1	0			
Washtenaw county: Ypsilanti city Feb. 25-June 17, 1901.)	81	1	Washtenaw county: Ypsilanti township (Dec. 9-Feb. 16, 1901.)	9	0			

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† Health officer of second locality did not report whether it was village or township.
‡ This foot-note is printed at the bottom of the first page of this table.

TABLE 6.—CONTINUED.—*Movement of infection of scarlet fever.*

First localities from which scarlet fever was spread.			Second localities infected from first.			Third localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Wayne county: Detroit city	391	18	Wayne county: Canton township (Nov. 30-Dec. 16.)	1	0			
			Delray village (July 7-Oct. 27.)	8	0			
			Romulus township (May 8-May 20.)	1	0			
Wayne county: Northville village (May 4-Aug. 29.)	6	0	Livingston county: Brighton village (Sept. 23-Oct.)	1	0			
Wexford county: Cadillac city (Nov. 15-Mar. 21, 1901.)	4	1	Missaukee county: Lake township (Dec. 23-Dec. 31.)	1	0			
Wexford county: Colfax township (Nov. 21-Jan. 10, 1901.)	10	0	Wexford county: Cedar Creek township. (Dec. 27-Jan. 10, 1901.)	1	0			
Wexford county: Harrietta village (May-June 10.)	2	0	Wexford county: Cadillac city (May. 18-Sept.)	14	2			
Wexford county: Springville township	2	0	Newaygo county: Croton township	2	0			
Movement of infection of scarlet fever **into Michigan** from outside the State.								
Canada	....	....	Huron county: Sebewaing village (April 28-Aug. 7.)	28	1			
Illinois: Chicago	....	....	Allegan county: Clyde township (May 25-June 17.)	1	0			
			Berrien county: Three Oaks village (Sept. 20. ——.)	2	0			
			Kent county: Gaines township (April 28-May 21.)	2	0			
			Oceana county: Clay Banks tp (Sept. 6-Sept. 20.)	1	0			
			Ottawa county: Holland township (April 29-Aug. 24.)	7	0			
			Van Buren county: Geneva township (July 26-Jan. 25, 1901.)	26	0			
			South Haven village (Sept. 14-Nov. 5.)	3	0	Allegan county: Saugatuck village (Oct. 15-Nov. 24.)	2	0
			Washtenaw county: Dexter village (Aug. 18-Feb., 1901.)	27	0	Washtenaw county: Dexter township (Dec.-Feb., 1901.)	12	1
						Webster township (Dec. 3-Apr. 9, 1901.)	6	0
			Wayne county: Springwells township. (Aug. 19-Aug. 31.)	1	0			
Indiana	....	....	Branch county: Noble township (Dec. 20-Feb. 5, 1901)	4	0			

TABLE 6.—CONTINUED.—*Movement of infection of scarlet fever* **into Michigan** *from outside the State.*

First localities from which scarlet fever was spread.			Second localities infected from first.			Third localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Indiana: Greenfield Mills........	....	....	St. Joseph county: Colon township........ (Dec.-Feb., 1901.)	10	0			
Missouri: St. Louis................	....	....	Emmet county: Petoskey city.......... (June 20-July 14.)	1	0			
New Mexico..............	....	....	Shiawassee county: Laingsburg village.... (Jan.-Feb. 10.)	4	0			
Ohio: Metamora................	....	....	Hillsdale county: Somerset township.... (Dec. 4-Jan. 1, 1901.)	2	0			
Ohio: Toledo....................	....	....	Manistee county: Onekama village........ (March 8-March 28.)	2	0			
Probable movement of infection of scarlet fever.								
Allegan county: Manlius township.......	‡	....	Allegan county: Saugatuck village...... (Mar. 6-Nov. 24.)	11	0			
Antrim county: Central Lake village... (Jan. 13-Mar. 17.)	10	2	Leelanau county: Glen Arbor township.. (April 5-Dec. 12.)	8	0			
Arenac county: Standish village........ (Jan. 3-Feb. 5.)	3	0	Tuscola county: Tuscola township......	1	0			
Barry county: Assyria township.......	‡	....	Eaton county: Kalamo township...... (Sept. 9-Oct. 15.)	4	0			
Bay county: Bay City.................. (Jan. 3-Dec. 31.)	293	13	Bay county: Monitor township...... (May 1-May 13.)	3	0			
			Mt. Forest township... (Oct. 12-Oct. 19.)	1	0			
Bay county: Frankenlust township. (Jan.-April 10.)	11	3	Saginaw county: Kochville township... (Jan. 7-Jan. 26.)	4	0			
Berrien county: Benton Harbor city..... (Nov. 29-Mar. 16, 1901.)	13	0	Berrien county: Sodus township.... ... (Dec. 28-Feb. 15, 1901.)	11	0			
Branch county: Coldwater city..........	1	0	Hillsdale county: Litchfield village......	6	0			
Calhoun county: Athens township........ (Oct.-Nov. 8.)	1	0	Calhoun county: Athens village......... (Oct.-Oct. 28.)	2	0			
Calhoun county: Battle Creek city........	59	3	Calhoun county: Pennfield township.... (Feb. 12-June 1.)	13	0			
Delta county: Escanaba city........... (—— Jan. 7.)	6	0	Delta county: Bark River township.. (Mar. 16-Mar. 24.)	1	0			
			Ford River township.. (Feb.-Mar. 15.)	3	0			

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‡ This foot-note is printed at the bottom of the first page of this table.

TABLE 6.—CONTINUED.—**Probable** *movement of infection of scarlet fever.*

First localities from which scarlet fever was spread.			Second localities infected from first.			Third localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Hillsdale county: Reading village........	1	0	Jackson county: Hanover village........ (May 26-June 3.)	2	0			
Houghton county: Calumet township...... (Jan.-Dec.)	324	18	Houghton county: Torch Lake township.. (May 31-June 29, 1901.)	48	1			
Ingham county: Lansing city............ (Jan.-Dec. 8.)	165	1	Ingham county: Delhi township........ (Jan. 1-May 30.)	11	0			
Lenawee county: Adrian township........ (Jan.-Jan.)	2	0	Lenawee county: Raisin township....... (Jan. 10-Feb. 1.)	1	0			
Lenawee county: Tecumseh village....... (June 3-Mar., 1901.)	37	0	Lenawee county: Tecumseh township... (Nov. 26-Dec. 13.)	4	0			
Marquette county: Ishpeming city.. .... (Mar.-Dec. 31.)	72	5	Marquette county: Tilden township....... (June 6-July 13.)	2	0			
Montcalm county: Carson City village.....	10	1	Montcalm county: Crystal township....... (Mar. 14-April 10.)	4	0			
Oscoda county...........	....	...	Montmorency county: Albert township........ (Mar. 10-July 27.)	17	0			
Ottawa county: Holland township...... (April-Aug. 24.)	7	0	Ottawa county: Holland city............ (April 9-May 18.)	5	1			
Saginaw county: Saginaw city............ (Sept. 1-Jan. 6, 1901.)	16	1	Marquette county: Champion township... (Sept. 23-Oct. 19.)	1	0			
			Oakland county: Holly township........ (Nov. 7 ——.)	1	0			
Ingham county: Lansing township...... (April 22-Oct. 18.)	12	1	Eaton county: Delta township......... (Oct. 2-Oct. 14.)	3	1			
Ionia county: North Plains township. (Nov. 15-Dec. 16.)	2	0	Clinton county: Lebanon township..... (Dec. 8-Jan. 3, 1901.)	2	0			
Jackson county: Jackson city............ (Jan. 23-July 17.)	15	0	Ingham county: Stockbridge village... (Sept. 25-Oct. 15.)	1	0			
Kalkaska county: Boardman township.... (Jan. 4 ——.)	1	0	Grand Traverse county: Paradise township.... (April 20-Dec. 8.)	14	0			
Kent county: Grand Rapids city...... (Jan. 20-April 17.)	351	7	Kent county: Caledonia village...... (Jan. 20-April 17.)	5	1			
			Cannon township...... (Jan. 6-Feb. 14.)	1	0			
Lake county: Luther village.......... (Feb. 12-March 27.)	9	0	Lake county: Ellsworth township.... (March 12-May 1.)	2	0			
Lapeer county: Rich township..........	1	0	Lapeer county: North Branch village.	35	0			

TABLE 6.—CONCLUDED.—**Probable** *movement of infection of scarlet fever.*

First localities from which scarlet fever was spread.			**Second** localities infected from first.			**Third** localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Schoolcraft county: Manistique village .... (May 18-July 27, 1901.)	85	9	Schoolcraft county: Doyle township........ (Dec. 3-Feb., 1901.)	6	1			
Shiawassee county: Corunna city............ (Sept. 2-Dec.)	2	0	Shiawassee county: New Haven township.. (Nov. ——.)	2	0			
St. Joseph county: Burr Oak† (village)...... (Jan.-Feb.)	4	0	St. Joseph county: Sherman township.... (Jan. 29-March 2.)	1	0			
Tuscola county: Caro village............. (Jan.-Jan. 16.)	2	1	Tuscola county: Gilford township...... (April 22-May 18.)	1	0			
Van Buren county: Waverly township...... (June 16-June 30.)	2	1	Van Buren county: Arlington township... (June 16-June 20.)	1	0			
Washtenaw county: Ypsilanti city.......... (Feb. 25-June 7, 1901.)	81	1	Wayne county; Canton township...... (Dec. 8-Dec. 30.)	1	0			
Wayne county: Detroit.................. (Jan.-Dec.)	391	18	Lapeer county: Arcada township...... (Oct. 11-Feb. 1, 1901.)	11	0			
			Wayne county: Taylor township....... (Oct. 20-Dec. 15.)	4	0			
Wayne county: Grosse Pointe township	7	0	Wayne county: Gratiot township......	1	1			
Probable movement of infection of scarlet fever **into Michigan** from outside the State.								
Illinois: Chicago..................	....	....	Allegan county: Cheshire township..... (Oct. 6-Nov. 3.)	1	0			
			Berrien county: Niles city............... (May 19-Jan. 12, 1901.)	28	0			
			Oronoko township..... (June 8-July 15.)	2	0			
Indiana: Mishawaka..............	....	....	Berrien county: Niles township......... (June 1-June 26.)	6	2			
Ohio	....	....	Bay county: Gibson township. ..... (Sept. 12-Jan. 14, 1901.	19	0			
Ohio: Toledo..................	....	....	Wayne county: Plymouth village...... (Feb. 18-April 30.)	3	0			
Wisconsin: Ashland..................	...	....	Ontonagon county: Ontonagon village..... (June 13-July 8.)	6	0			

† Health officer of second locality did not report whether it was village or township.

Estimated number of cases of scarlet fever prevented, and number of lives saved, by isolation and disinfection.—Tables 7 and 8 and the accompanying diagram compare the average numbers of cases and deaths in outbreaks of scarlet fever where the measures of isolation and disinfection, prescribed by the Michigan State Board of Health, were enforced, with the average numbers of cases and deaths in those outbreaks where those measures were neglected.* By Table 7 it may be seen that during the fourteen years, 1887-1900, there were six times as many cases and deaths in those outbreaks in which these measures were neglected as in those outbreaks in which they were enforced.

By Table 7 it may be seen that during the year 1900 there were reported to the office of the State Board of Health 783 outbreaks of scaret fever, with 4,389 cases, including 218 deaths.† Had no efforts at restriction been made, and had the average numbers of cases and deaths per outbreak remained the same as in the column headed "Isolation and disinfection both neglected," there would have occurred 8,167 cases, including 360 deaths, and taking from these respectively the cases (4,389) including deaths (218), which did occur, leaves 3,778 cases, including 142 deaths, indicated as prevented in these 783 outbreaks, by isolation and disinfection. By the same method for each year the indicated saving in the 7,157 outbreaks which occurred during the fourteen years, 1887-1900, is 40,537 cases, including 1,468 lives. This is shown in Table 8.

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* In the compilation of the reports for Tables 7 and 8 and the diagram showing the results obtained by isolation and disinfection, every effort has been made to place the numbers of cases and deaths in each outbreak in the proper columns. If, for instance, there were only one or two cases in an outbreak and the health officer neglected to isolate and disinfect, but for some reason the disease spread no further, the number of cases and deaths were placed in the column headed "Isolation and disinfection both neglected." If, on the other hand, as often occurs, quite a number of persons are exposed at the same time and place outside the health officer's jurisdiction, and by proper isolation and disinfection he succeeds in confining the disease to the original cases exposed, they are placed in the column headed "Isolation and disinfection enforced." If, however, he neglects to properly isolate and disinfect, the whole number of these cases and deaths are placed in the "neglected" column. It is to be regretted that many of the reports received at this office do not state exactly what was done to restrict the disease, or are not sufficiently definite to enable the compilers to decide just what was done, and they are obliged to place all such in the column headed "Isolation or disinfection or both not mentioned, or statements doubtful."

† *Definition of outbreak.*—For studying the influence of isolation and disinfection in restricting outbreaks of communicable diseases, an outbreak is considered as the existence of one or more cases of a particular communicable disease within any health officer's jurisdiction, whether city, village, or township. All cases of the disease occurring within the jurisdiction during the outbreak are considered as part of the outbreak, unless the contagium cannot be traced to cases within the jurisdiction, and can be clearly traced to cases outside of the jurisdiction, in which instance they are considered as constituting a separate outbreak. When a period of over sixty days has elapsed since the last case (in a given jurisdiction) died or recovered, the outbreak is considered as ended,—unless new cases occur the contagium of which can be traced back to the preceding cases, in which instance the latter cases are considered as part of the same outbreak. Possibly the sixty-day limit may, at some future time, be changed to ninety days; but in order to study the subject systematically, there must be a limit in time, as also in area. Also, comparisons of *years* require that outbreaks be counted as closed, at the end of the *year;* while in comparing *outbreaks* for testing the value of isolation and disinfection it is necessary to take *complete outbreaks,* even where they extend from one year into the next. This explains any apparent discrepancy between the numbers of outbreaks, cases and deaths here given and the numbers given at the beginning of this article.

TABLE 7.—SCARLET FEVER IN MICHIGAN IN 1900: *Exhibiting the average numbers of cases and deaths per outbreak:—(1) in all the 783 outbreaks reported; (2) in the 306 outbreaks in which it is doubtful whether or not disinfection or isolation was enforced; (3) in the 16 outbreaks in which disinfection was enforced and isolation doubtful; (4) in the 62 outbreaks in which isolation was enforced and disinfection was doubtful; (5) in the 40 outbreaks in which disinfection was enforced and isolation neglected; (6) in the 56 outbreaks in which isolation was enforced and disinfection neglected; (7) in the 138 outbreaks in which isolation and disinfection were both neglected; (8) in the 165 outbreaks in which isolation and disinfection were both enforced.*

	(1) All outbreaks. (783 outbreaks.)*		(2) Isolation or disinfection or both not mentioned, or statements doubtful. (306 outbreaks.)		(3) Disinfection enforced—isolation doubtful. (16 outbreaks.)		(4) Isolation enforced—disinfection doubtful. (62 outbreaks.)		(5) Disinfection enforced—isolation neglected. (40 outbreaks.)		(6) Isolation enforced—disinfection neglected. (56 outbreaks.)		(7) Isolation and disinfection both neglected. (138 outbreaks.)		(8) Isolation and disinfection both enforced. (165 outbreaks.)	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals....	‡4,389	218	‡1,762	93	‡78	4	‡269	10	‡284	19	‡140	3	‡1,439	63	‡417	26
Averages	5.61	.28	5.76	.30	4.88	.25	4.34	.16	7.10	.48	2.50	.05	†10.43	†.46	†2.53	†.16

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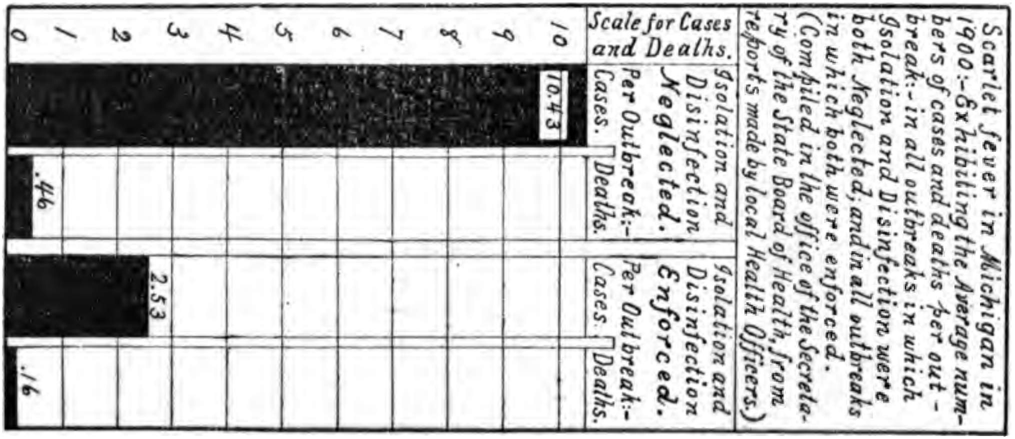
* These do not include the cases and deaths in Detroit, Grand Rapids, Lansing, Bay City, Kalamazoo, Port Huron, Battle Creek, a few other cities, and Grayling, Calumet and Osceola townships, because of the difficulty in determining the beginning and ending of an outbreak in these cities or townships, in which the disease was present in some part of the city or township nearly all the time.

† These figures are graphically represented in the diagram on this page, entitled "Isolation and disinfection restrict scarlet fever."

‡ Includes deaths.

ISOLATION AND DISINFECTION RESTRICT SCARLET FEVER.



This diagram graphically represents the lower line of figures in the last four columns of Table 7.

[PLATE 1101]

TABLE 8.—SCARLET FEVER.—*Exhibiting for the 14 years, and for each of the 14 years 1887-1900, the numbers of reported outbreaks, cases and deaths; also for this 14-year period, the average numbers of cases and deaths per outbreak in all outbreaks; in those outbreaks in which isolation or disinfection or both were doubtful; isolation and disinfection both neglected; isolation and disinfection both enforced; and, also, the numbers of cases and deaths indicated as having been prevented by isolation and disinfection.*

Years.	*All outbreaks.			Isolation or disinfection, or both, not mentioned, or statements doubtful.			Isolation and disinfection both neglected.			Isolation and disinfection both enforced.			Cases and deaths indicated as having been prevented by isolation and disinfection.	
	Outbreaks.	Cases.‡	Deaths.	Outbreaks.	Cases.‡	Deaths.	Outbreaks.	Cases.‡	Deaths.	Outbreaks.	Cases.‡	Deaths.	Cases.‡	Deaths.
1887	299	1,882	141	190	1,200	93	32	440	34	64	148	11	† 2,220	† 177
1888	340	1,838	112	225	955	74	61	724	33	36	80	3	† 2,198	† 72
1889	417	2,822	123	284	1,453	61	72	1,208	48	52	140	10	† 4,175	† 156
1890	477	3,054	115	302	1,711	67	94	1,137	36	42	76	1	† 2,718	† 66
1891	602	4,936	193	380	3,012	91	141	1,704	66	42	107	1	† 2,342	† 90
1892	622	5,240	306	377	2,944	188	110	1,621	59	42	97	7	† 3,928	† 30
1893	667	5,219	327	387	3,197	204	124	1,511	99	60	157	8	† 2,912	† 207
1894	662	4,349	175	378	2,366	93	104	1,348	42	74	187	9	† 4,231	† 90
1895	555	2,905	85	275	1,259	42	82	1,138	27	92	162	4	† 4,798	† 98
1896	389	1,534	42	148	485	15	80	681	16	78	153	4	† 1,776	† 36
1897	336	1,531	52	130	654	21	63	427	17	59	127	5	† 747	† 39
1898	397	1,759	74	140	645	24	52	441	23	88	202	6	† 1,608	† 101
1899	611	3,531	148	202	1,315	52	108	1,251	63	133	325	7	† 3,544	† 206
1900	783	4,389	218	306	1,762	93	138	1,439	63	165	417	26	† 3,778	† 142
Totals	7,157	44,989	2,111	3,724	22,958	1,118	1,261	15,070	626	1,027	2,378	102	§40,975 §40,537	§1,510 §1,468
Averages, 14 years	511	3,214	151	266	1,640	80	91	1,076	45	73	170	7	2,927	108
Average cases and deaths per outbreak for fourteen years, 1887-1900	....	6.29	.29	....	6.16	.30	....	11.95	.50	....	2.32	.10	....	....

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* Outbreaks in Detroit, Grand Rapids and a few other localities, where the disease was present throughout the whole year, are not included, owing to the difficulty in determining the beginning and ending of an outbreak in those localities. The localities which are thus excluded in 1900, are given in a foot-note to Table 7 of this article; and for previous years, in foot-notes to similar tables in articles on scarlet fever for those years.

† The numbers of cases and deaths in this double column are found by multiplying "all outbreaks" for each year by the average numbers of cases or deaths per outbreak, in those outbreaks in which isolation and disinfection were both neglected, for that year, and deducting from the results thus obtained, the cases or deaths, as the case may be, which were reported to have occurred that year. § The two sets of numbers appearing in this column are based on two distinct methods of solution which are explained as follows:—(1) The 40,975 cases and 1,510 deaths are totals of the columns representing cases and deaths saved as explained in the † foot-note, (2) the 40,537 cases and 1,468 deaths are obtained by multiplying the average number of cases and deaths per outbreak for the fourteen years, 1887-1900 (11.95 and .50 where isolation and disinfection were neglected) by the total number of outbreaks, to find the numbers which would have occurred if all outbreaks had been neglected, and subtracting therefrom the numbers of cases and deaths that were reported as having occurred during the fourteen-year period.

‡ Includes deaths.

Period of incubation, in scarlet fever.—The average period of incubation in the 170 reported instances is 9.1 days; the greatest number of instances given in any single period was in the seven-day period.

TABLE 9.—*Exhibiting the reported period of incubation, stated in days, in 170 instances of scarlet fever. Compiled from reports of health officers in Michigan, for the year 1900.*

Incubation period—days.....	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	17	18	21	28	30	33
Instances in each period...	*1	3	8	18	†15	‡5	§28	¶15	‖18	**17	3	††3	2	‡‡19	1	§§2	1	¶¶7	1	2	1

* In this instance, reported as about 1 day. † In 5 of these instances reported as about 5 days. ‡ In 3 of these instances, reported as about 6 days. § In 13 of these instances, reported as about 7 days. ¶ In 5 of these instances, reported as about 8 days. ‖ In 9 of these instances, reported as about 9 days. ** In 6 of these instances, reported as about 10 days. †† In 2 of these instances, reported as about 12 days. ‡‡ In 7 of these instances, reported as about 14 days. §§ In 1 of these instances, reported as about 17 days. ¶¶ In 2 of these instances, reported as about 21 days.

Ages of greatest prevalence of, and mortality from, scarlet fever.—Of the total numbers of cases, including deaths, reported to this office for the year 1900, the number of deaths per 100 cases was 4.5; and in the smaller numbers of cases, including deaths, of which the ages were stated, the number of deaths per 100 cases was 5.7; of the 6,734 cases of scarlet fever reported, of which 306 were fatal cases, the ages were stated for 4,608 cases, 261 of these being fatal cases.

TABLE 10.—*Exhibiting in certain age-groups, the numbers of cases and deaths from scarlet fever; the per cent that the cases in each group were of all cases; the per cent that the deaths in each group were of all deaths; and the per cent that the deaths in each group were of the cases in that group.—Compiled from all reports for the year 1900, which stated the ages.*

	Number and per cent of cases and deaths in certain age-groups.																					
Ages in groups of years..............	All ages known.	0-1.	1-2.	2-3.	3-4.	4-5.	0-5.	5-9.	10-14.	15-19.	20-24.	25-29.	30-34.	35-39.	40 44.	45-49.	50-54.	55-59.	Over 60.
No. of cases*.......	4,608	48	126	234	327	366	1,101	2,042	953	262	120	44	35	30	13	4	3	0	1
Per cent the cases in each group were were of all cases..	......	1.0	2.7	5.1	7.1	7.9	23.9	44.3	20.7	5.7	2.6	1.0	.8	.7	.3	.1	.1	0	.02
No. of deaths†......	261	16	27	33	35	27	138	84	23	6	4	0	2	3	1	0	0	0	0
Per cent the deaths in each group were of cases in that group.............	5.7	33.3	21.4	14.1	10.7	7.4	12.5	4.1	2.4	2.3	3.3	0	5.7	10.0	7.7	0	0	0	0
Per cent the deaths in each group were of all deaths.......	......	6.1	10.3	12.6	13.4	10.3	52.9	32.2	8.8	2.3	1.5	0	.8	1.1	.4	0	0	0	0
Per cent the deaths in special groups were of all deaths.	......	52.9					85.1		8.8	5.7					.4				

* Does not include cases where the age was not stated.
† Does not include deaths where the age was not stated.

Table 10 shows that the greatest fatality was in children under one year of age, the fatality decreasing each succeeding year, and period of years, up to twenty years of age. From thirty to forty-five years of age the fatality is increased.

TABLE 11.—*Exhibiting in certain age-groups, the numbers of cases and deaths from scarlet fever in the year 1900, and in the eight years, 1892-99; the per cent that the cases in each group were of all cases; the per cent that the deaths in each group were of all deaths. Compiled from all reports for the years 1892-1900, which stated the ages.*

Year.		Total No. included. *	Per cent of cases and deaths in certain age-groups.										
			All ages.	0 to 5.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 41.	45 years and over.
1900.	Cases	4,608	100	23.9	44.3	20.7	5.7	2.6	1.0	.8	.7	.3	.2
	Deaths	261	100	52.9	32.2	8.8	2.3	1.5	0	.8	1.1	.4	0
1892-99.	Cases	18,488	100	31.8	40.7	17.3	5.3	2.0	1.3	.8	.5	.2	.1
	Deaths	847	100	56.4	28.6	9.7	2.8	1.3	.2	.6	.1	.2	0

* In this table *cases* include both *fatal* and *non-fatal* cases.

TABLE 12.—*Exhibiting, by sex, and in certain age-groups, the per cent of persons who died from scarlet fever in Michigan, during the year 1900, and the averages for the seven years, 1893-99; also the average age at death, and the number of deaths included. (Compiled from such reports as stated the ages.)*

Deaths from scarlet fever.														
Year.	Sex.	Average age, years.	No. of deaths included.	Ages.—In periods of years. Per cent of deaths in each period of age.										
				All ages.	Under 5 years.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 years and over.
1900.	Males	5.0	133	100	58.6	29.3	7.5	3.0	0	0	.8	.8	0	0	0
	Females	6.6	128	100	46.9	35.2	10.2	1.6	3.1	0	.8	1.6	.8	0	0
1893-99.	Males	5.3	345	100	55.1	32.5	7.0	3.5	.9	.6	.3	.3	0	0	0
	Females	6.1	374	100	51.3	29.7	12.6	3.7	1.6	.3	.5	0	.3	0	0

Table 11 shows that the greatest per cent of all cases, fatal and non-fatal, of scarlet fever occurred in children from five to nine years of age, and the greatest per cent of all deaths was in children under five years of age, both for the year 1900, and for the eight years, 1892-99.

The average age of decedents for the seven years, 1893-99, was 5.3 for males and 6.1 years for females. The average age of cases recovering from this disease for the seven years was 7.8 years for males, and 8.8 years for females.

TABLE 13.—*Exhibiting, by sex, the per cent of persons in certain age-groups who recovered from scarlet fever, in Michigan, during the year 1900, and the averages for the seven years, 1893-99; also the average age and the number of cases included. (Compiled from such reports as stated the ages.)*

Year.	Sex.	Average age of non-fatal cases, years.	No. of cases included.	Age.—In periods of years. Per cent of (non-fatal) cases in each period of age.											
				All ages.	Under 5 years.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 years and over.
1900.	Males.....	8.2	2,024	100	23.8	46.1	19.6	5.6	2.7	.9	.5	.4	.1	.05	0
	Females..	9.1	2,323	100	20.7	44.0	22.9	6.1	2.7	1.1	.9	.8	.4	.1	.2
1893-99.	Males.....	7.8	6,843	100	29.5	43.0	18.5	4.8	1.8	1.0	.6	.5	.2	.1	.04
	Females..	8.8	8,094	100	24.2	42.3	20.7	6.4	2.6	1.7	1.0	.7	.3	.1	.1

Average duration of scarlet fever. Fatal and non-fatal cases.—The average duration of fatal cases of scarlet fever for the year 1900 was 11.3 days for males and 12.7 days for females. For the seven years, 1893-99, the average duration of fatal cases was 11.3 days for males and 10.6 for females.

The average duration of non-fatal cases of scarlet fever for the year 1900 was 22.3 days for males and 22.4 days for females. For the seven years, 1893-99, the average duration of sickness for non-fatal cases was 17.4 days for males, and 19.5 days for females.

TABLE 14.—*Exhibiting, by sex of patient, by per cent of cases which died in specified periods of time, the duration (in days) of fatal cases of sickness from scarlet fever in Michigan, during the year 1900, and the averages for the seven years, 1893-99. (Compiled from those reports which stated the length of time the patient was sick.)*

Fatal cases of scarlet fever.														
Year.	Sex.	No. of fatal cases included.	Duration of sickness:—Per cent of deaths in each period of days.											
			All periods.	0 to 5.	6 to 10.	11 to 15.	16 to 20.	21 to 25.	26 to 30.	31 to 35.	36 to 40.	41 to 45.	46 to 50.	51 days and over.
1900.	Males	81	100	39.5	24.7	12.3	7.4	2.5	4.9	6.2	1.2	0	0	1.2
	Females...	85	100	35.3	21.2	15.3	9.4	10.6	1.2	1.2	0	0	3.5	2.4
1893-99.	Males...........	241	100	36.9	27.0	13.7	6.6	6.2	2.9	2.1	1.7	.8	0	2.1
	Females.........	266	100	42.9	22.2	14.7	7.1	4.5	1.9	3.4	.8	1.5	0	1.1

TABLE 15.—*Exhibiting, by sex of patient, by per cent of cases which recovered in specified periods of time, the duration (in days) of non-fatal cases of sickness from scarlet fever in Michigan, during the year 1900, and the averages for the seven years, 1893-99. (Compiled from those reports which stated the length of time the patient was sick.)*

Non-fatal cases of scarlet fever.														
Year.	Sex.	No. of cases included.	Duration of sickness:—Per cent of non-fatal cases in each period of days.											
			All periods.	0 to 5.	6 to 10.	11 to 15.	16 to 20.	21 to 25.	26 to 30.	31 to 35.	36 to 40.	41 to 45.	46 to 50.	Over 50 days.
1900.	Males	1,665	100	3.4	11.7	15.4	15.7	16.8	16.8	9.4	5.0	2.4	1.7	1.7
	Females	1,940	100	1.8	11.3	16.1	16.0	19.2	16.2	8.9	4.5	2.4	2.1	1.5
1893-99.	Males	4,573	100	3.6	18.5	20.7	17.0	14.7	10.7	5.7	3.6	2.6	1.3	1.5
	Females	5,253	100	3.3	17.6	21.9	17.1	15.0	11.3	5.8	3.3	2.5	.9	1.2

RÖTHELN (GERMAN MEASLES) IN MICHIGAN IN 1900.

During the year ending December 31, 1900, there were reported to the Secretary of the State Board of Health thirty outbreaks of rötheln resulting in 283 cases.

There were fifteen final reports in reference to the restriction of this disease sent to this office. Of these, in two outbreaks only, were restrictive measures thoroughly enforced.

The main reason for efforts for the restriction of rötheln is the fact that scarlet fever is so often mistaken for rötheln, so that in restricting what is apparently rötheln a more fatal disease is sometimes restricted.

In all cases the public health should be given the benefit of any doubt, and precaution taken against the spread of any contagious disease which may prove to be dangerous.

MEASLES IN MICHIGAN.—DURING THE YEAR ENDING DECEMBER 31, 1900.

There were reported by local health officers to the Secretary of the State Board of Health, in all 962 outbreaks of measles, in 733 local jurisdictions, as having occurred in Michigan during the year 1900; and in these outbreaks there were reported to have occurred 20,403 cases,* including 282 deaths.

The office of the State Board of Health is making constant efforts to get local health officials, and the people generally, to take measures to prevent the spread of measles, and to make reports to the local health officers and they to the Secretary of the State Board of Health, concerning that disease in the several localities; but it is probable that a large number of cases are not yet reported. From Detroit and Bay City, for instance, the fatal cases only were reported.

MEASLES IN 1900, COMPARED WITH PREVIOUS YEARS.

According to reports made to the Secretary of the State Board of Health.—Compared with 1899, Table 1 shows an increase in 1900 of 348 outbreaks, 8,398 cases,* and 116 deaths. The increase in the average numbers of cases and deaths per outbreak was slight,—1.6 cases and .03 of one death.

The fatality was the same for both years, 1.4 deaths per 100 cases. Excluding Detroit in both years, and Bay City in 1900, the fatality was slightly less for each year, 1.1 deaths per 100 cases in 1899 and 1.2 deaths in 1900.

TABLE 1.—*Exhibiting the numbers of outbreaks, cases and deaths from measles, the number of localities in which they occurred, the average numbers of cases and deaths per outbreak, and the per cent of cases which proved fatal, for the year 1899 and 1900, and the averages for the 10 years, 1890-99; with the departures of the same for 1900, from 1899 and from the average of the same for the 10 years, 1890-99.*

Year.	Reported outbreaks.	Reported localities.	Reported cases.	Av. No. of cases per outbreak.	Reported deaths.	Av. No. of deaths per outbreak.	Deaths per 100 cases.
1899..................	614	504	12,005	19.6	166	.26	1.4
1900..................	962	733	20,403	21.2	282	.29	1.4
Departure of 1900 from 1899............	+348	+229	+8,398	+1.6	+116	+.03	.0
Average for 10 years, 1890-99..............	441	390	12,121	27.5	116	.26	1.0
Departures of 1900 from the averages for 10 years, 1890-99..	+521	+343	+8,282	—6.3	+166	+.03	+.4

* Throughout this article "cases" include both fatal and non-fatal cases.

Compared with the averages for the ten years, 1890-99, the increase in 1900 was 521 outbreaks, 8,282 cases and 166 deaths. But the average number of cases per outbreak in 1900 was 6.3 cases less than the average number for the ten years. The increase in the average number of deaths per outbreak was the same as the increase of 1900 over 1899, —.03 of one death per outbreak.

There was but a slight increase, .4 of one death per 100 cases, in the fatality for 1900 over the average fatality for the ten years, 1890-99.

According to reports made to the Secretary of State.—Table 2 is based upon returns of deaths made to the Secretary of State. For all years preceding 1898 the statistics of death were collected after the close of the year in which they occurred; for all years after 1897 the deaths were recorded before burial, and returns were made to the Secretary of State early in the following month. There is reason to believe that under the new law nearly all deaths are included in the statistics, whereas before 1898 a considerable proportion was omitted. This fact should be held in mind in comparing the deaths reported for the year 1900 with those reported in years previous to 1898.

TABLE 2.—*Exhibiting the reported number of deaths from measles per 100,000 persons living in Michigan in each of the 33 years, 1868-1900. (Compiled from the Secretary of State's Vital Statistics of Michigan. Population for intercensal years estimated by average annual increase based on National and State Censuses.)*

Year.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.
Deaths (per 100,000, etc.)	8.66	12.88	4.72	5.45	14.12	18.56	3.37	9.50	8.10	4.13	1.03	10.49	7.63	15.21

Year.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.
Deaths etc....	8.68	14.54	7.91	2.04	6.75	14.56	20.62	5.08	10.94	10.51	3.29	5.76	3.75	1.93	5.22

Year.	1897.	1898.	1899.	1900.
Deaths etc....	8.2	5.6	7.8	14.1

Sickness-rates from reported measles.—In comparing sickness-rates it should be borne in mind that many cases of sickness from measles are not reported, and that it is probable that the omissions are greater in some parts of the State than in others. In Detroit only the forty-five fatal cases were reported. If the ratio of deaths to cases was the same there as in the other part of the State, the cases of measles in Detroit were 3,750. In Bay City but two deaths were reported. In Slagle township, Wexford county, the health officer reported that "nearly the whole township had them," and reported but the four deaths. One fatal case from each of twenty-two different localities was reported. In six of these instances, restrictive measures were neglected; in one instance, disinfection was enforced but isolation neglected; and in the other instances it was not mentioned whether restrictive measures were enforced or not, or it was doubtful whether or not restrictive measures were enforced. This would suggest that there were other cases of sickness from measles in these localities and only the fatal cases were reported. Other reports from local health officials show that all cases of sickness from measles are not reported.

The sickness-rate from reported measles for the State, excluding Detroit and Bay City, where none but fatal cases were reported, was 96.58 cases per 10,000 population. The highest sickness-rate, by counties, was in Ontonagon county, where the rate was 597.06 cases per 10,000 population. The rate in Roscommon county (447.68) was next highest.

The lowest sickness-rate, .95 of one case per 10,000 population, was in Leelanau county.

Death-rates from reported measles.—The death-rate from reported measles for the State was 1.16 deaths per 10,000 population. The highest death-rate, by counties, was in Kalkaska county, 8.41 deaths per 10,000 population.

The death-rate in Wayne county was 1.63 deaths per 10,000 population. Subtracting the population of Detroit from the population of Wayne county, the death-rate in Wayne county, exclusive of Detroit, was 1.90 deaths per 10,000 population; and the death-rate in Detroit was 1.58 deaths per 10,000 population.

Fatality, or "case-mortality" from reported measles.—The fatality from reported measles in 1900, i. e., the proportion of reported cases which proved fatal was, for the whole State, 1.4 per cent, or about one death to 100 cases reported. The fatality for the State exclusive of Detroit and Bay City, where none except fatal cases were reported, was 1.2 per cent. The maximum fatality (20 per cent) occurred in Oscoda county. Probably this was because the mild cases were not as completely reported as in other localities. The minimum fatality (.18 of one death per 100 cases) occurred in Houghton county. In seventeen counties from which sickness from measles was reported there were no deaths reported from this disease.

Distribution of measles in cities, villages and townships.—Study of the last two columns in Table 4 reveals two encouraging facts: the proportion of reported cases to inhabitants was greater in the villages than in the townships, yet the proportion of reported deaths to inhabitants was not as large in the villages as in the townships. Apparently the first movement in the work of the restriction of measles—the reporting of the cases, has been well commenced in the villages in Michigan. And in the villages the consequent reduction of the deaths has apparently occurred.

TABLE 3.—*Numbers of cases and deaths reported from measles, and the cases and deaths per 10,000 persons living in each county in Michigan during the year 1900.*

State and counties.	Population of Michigan for 1900.	Number of reported		Number per 10,000 population, of	
		Cases.	Deaths.	Cases.	Deaths.
State	2,420,982	*20,356	282	†196.58	1.16
Alcona	5,691	93	3	163.42	5.27
Alger	5,868	3	0	5.11	0
Allegan	38,812	112	1	28.86	.26
Alpena	18,254	154	1	84.37	.55
Antrim	16,568	155	9	93.55	5.43
Arenac	9,821	30	2	30.55	2.04
Baraga	4,320	0	0	0	0
Barry	22,514	287	1	127.48	.44
Bay	62,378	‡210	12	‡60.43	1.92
Benzie	9,685	139	4	143.52	4.13
Berrien	49,165	340	5	69.15	1.02
Branch	27,811	144	1	51.78	.36
Calhoun	49,315	240	3	48.67	.61
Cass	20,876	561	9	268.73	4.31
Charlevoix	13,956	60	2	42.99	1.43
Cheboygan	15,516	76	1	48.98	.64
Chippewa	21,338	44	0	20.62	0
Clare	8,360	41	1	49.04	1.20
Clinton	25,136	363	2	144.41	.80
Crawford	2,943	17	0	57.76	0
Delta	23,881	49	1	20.52	.42
Dickinson	17,890	66	0	36.89	0
Eaton	31,668	526	2	166.10	.63
Emmet	15,931	171	1	107.34	.63
Genesee	41,804	78	0	18.66	0
Gladwin	6,564	84	0	127.97	0
Gogebic	16,738	28	0	16.73	0
G'd Traverse	20,479	58	4	28.32	1.95
Gratiot	29,889	343	7	114.76	2.34
Hillsdale	29,865	552	2	184.83	.67
Houghton	66,063	542	1	82.04	.15
Huron	34,162	93	0	27.22	0
Ingham	39,818	167	2	41.94	.50
Ionia	34,329	642	7	187.01	2.04
Iosco	10,246	33	0	32.21	0
Iron	8,990	155	3	172.41	3.34
Isabella	22,784	202	1	88.66	.44
Jackson	48,222	109	3	22.60	.62
Kalamazoo	44,310	1,360	4	306.93	.90
Kalkaska	7,133	181	6	253.75	8.41
Kent	129,714	1,851	18	142.70	1.39
Keweenaw	3,217	67	1	208.27	3.11
Lake	4,957	10	0	20.17	0
Lapeer	27,641	352	5	127.35	1.81
Leelanau	10,556	1	0	.95	0
Lenawee	48,406	489	1	101.02	.21
Livingston	19,664	20	1	10.17	.51
Luce	2,983	3	0	10.06	0
Mackinac	7,703	13	0	16.88	0
Macomb	33,244	291	6	87.53	1.80
Manistee	27,856	378	6	135.70	2.15
Marquette	41,239	1,397	4	338.76	.97
Mason	18,885	113	4	59.84	2.12
Mecosta	20,693	85	1	41.08	.48
Menominee	27,046	32	0	11.83	0
Midland	14,439	144	1	99.73	.69
Missaukee	9,308	177	1	190.15	1.07
Monroe	32,754	276	5	84.26	1.53
Montcalm	32,754	330	5	100.75	1.53
Montmorency	3,234	46	0	142.24	0
Muskegon	37,036	190	4	51.30	1.08
Newaygo	17,673	148	3	83.74	1.70
Oakland	44,792	448	4	100.02	.89
Oceana	16,644	43	0	25.84	0
Ogemaw	7,765	79	2	101.74	2.58
Ontonagon	6,197	370	0	597.06	0
Osceola	17,859	61	1	34.16	.56
Oscoda	1,468	5	1	34.06	6.81
Otsego	6,175	68	2	110.12	3.24
Ottawa	39,667	224	2	56.47	.50
Presque Isle	8,821	206	1	233.53	1.13
Roscommon	1,787	80	1	447.68	5.60
Saginaw	81,222	588	8	72.39	.98
Sanilac	35,055	888	7	253.32	2.00
Schoolcraft	7,889	0	0	0	0
Shiawassee	33,866	67	1	19.78	.30
St. Clair	55,228	426	4	77.13	.72
St. Joseph	23,889	280	2	117.21	.84
Tuscola	35,890	269	6	74.95	1.67
Van Buren	33,274	650	4	195.35	1.20
Washtenaw	47,761	284	5	59.46	1.05
Wayne	348,793	‡263	57	‡41.69	1.63
Wexford	16,845	136	7	80.74	4.16

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* This number does not include the forty-five fatal cases reported from Detroit, nor the two fatal cases reported from Bay City.

† Excluding the population of Detroit and Bay City, where none except fatal cases of measles were reported.

‡ The fatal cases and population for Bay City and Detroit are not included in their respective counties in computing the case-rates for these counties.

TABLE 4.—*Exhibiting the numbers of outbreaks and cases of and deaths from measles which occurred in the cities, villages, and townships of Michigan in 1900, and the comparative numbers of outbreaks, cases, deaths, and fatality from this disease in cities, villages and townships. (Compiled from reports of local health officers to the Secretary of the State Board of Health.)*

Classes of political divisions.	Population.	Health jurisdictions.	Outbreaks in:			Cases.	Deaths.	Fatality. (Per cent deaths of cases.)	Rates per 10,000 population.	
			Localities.		No. of					
			No. of	Per cent of all localities.					Cases.	Deaths.
State..............................	2,420,982	1,589	733	46.1	962	20,403	282	*1.2	*96.58	1.16
Cities..............................	939,759	78	64	82.1	98	5,883	96	*.8	*93.16	1.02
Villages..............................	275,251	305	156	51.1	182	3,731	23	.6	135.55	.84
Townships..............................	1,205,972	1,206	513	42.5	682	10,789	163	1.5	89.46	1.35

* Excluding Detroit and Bay City, where none except fatal cases were reported.

Number of outbreaks of measles in each month of the year 1900.—The last line of figures in Table 5, representing the reported number of outbreaks present, is not derived from the preceding two lines, as might be supposed, but is obtained by actual count of the number of outbreaks reported as existing in each month. Frequently the beginning of an outbreak is reported but the end of the outbreak is not reported; and sometimes the month in which the outbreak ended is given without giving the date of the beginning of the outbreak. In either case the outbreak may have begun and ended in the same month, or it may have extended through several months.

In computing the number of cases present in each month, each case is counted present in each month in which, or part of which, it was reported to have existed. The number of localities infected in each month were computed in a like manner.

TABLE 5.—*Exhibiting the reported number of outbreaks of measles which began, the number which ended, and the number which were present, in each month of the year 1900, in the different local jurisdictions of Michigan.*

Outbreaks.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Number began.....	136	109	148	135	99	81	56	23	13	16	18	23	857
Number ended.....	66	69	116	122	119	129	98	60	26	12	17	24	858
Number present...	208	253	330	332	300	257	175	95	47	37	41	45	....

The second and fourth lines of figures in Table 6 exhibit what per cent the cases present in each month and the cases taken sick in each month were of the total number (20,403) of cases of measles reported to this office for the year 1900.

The last line of figures in this table exhibits what per cent the localities infected in each month were of the total number (733) of infected localities reported during the year 1900.

TABLE 6.—*Exhibiting the number and per cent of cases of measles present, and the number and per cent of cases taken sick, and the number and per cent of localities infected in Michigan in each month of the year 1900.*

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Number of cases present...	1,947	2,544	2,883	2,869	2,378	1,885	973	366	164	398	535	433
Per cent of cases present..	9.6	12.5	14.1	14.1	11.1	9.2	4.8	1.8	.8	2.0	2.6	2.1
Number of cases taken sick......................	1,872	2,044	2,329	2,312	1,921	1,463	588	254	117	377	423	317
Per cent of cases taken sick......................	9.2	10.0	11.4	11.3	9.4	7.2	2.9	1.2	.6	1.8	2.1	1.6
Number of localities present......................	197	242	306	312	290	252	169	93	46	37	41	44
Per cent of localities present......................	26.9	33.0	41.7	42.6	39.6	34.4	23.1	12.7	6.3	5.0	5.6	6.0

Source of the contagium of cases of measles.—Of the 20,403 cases of measles reported to this office, as having occurred in Michigan in the year 1900, the local health officials reported relative to the source of contagium in ways which may be summarized as follows: Traced to former case, 6,227; probably traced to a former case, 147; from outside jurisdiction, 323; probably from an outside jurisdiction, 27; unknown, 9,938; not stated, 3,737; attributed to infected articles, etc., 4.

Outbreaks of measles reported traced to previous outbreaks.—According to reports of local health officers in Michigan the contagium of measles was permitted to spread from 175 outbreaks, having an aggregate of 8,552 cases, including 120 deaths, to 311 other outbreaks resulting in 4,873 cases, including forty-eight deaths. From some of these second localities, the contagium was further spread to third localities, resulting in sixty-one outbreaks with 795 cases, including nine deaths; from thence to fourth localities, resulting in five outbreaks with 108 cases; from one of these localities the contagium spread to a fifth locality, resulting in an outbreak of twelve cases; from this fifth locality the contagium spread to a sixth locality, resulting in four cases; and from this sixth locality the contagium further spread to seventh localities, resulting in two outbreaks and eight cases of sickness.

Twenty-nine outbreaks, with an aggregate of 424 cases, including four deaths, were reported as having been traced to localities outside of Michigan. From some of these twenty-nine outbreaks, the contagium was further spread to ten localities, resulting in 139 cases; from some of these third localities the contagium spread to fourth localities, resulting in four outbreaks, eight cases, including one death; and from one of these fourth localities the contagium spread to a fifth locality, resulting in four cases.

A total of 425 outbreaks with an aggregate of 6,375 cases, including sixty-two deaths, were actually traced to previous outbreaks of measles.

In thirty-three outbreaks, with an aggregate of 857 cases, including seven deaths, the contagium was reported as *probably* traced to other outbreaks in Michigan. One outbreak, with two cases, was reported as *probably* traced to outbreaks outside the State; this outbreak was reported as the probable source of contagium of two more outbreaks with 138 cases, and one of these outbreaks as the probable source of another outbreak of five cases of sickness.

Immigrants possibly exposed to measles destined to settle in Michigan.—During the year six notices were received, one each from the surgeons of the steamships Parisian, Tunisian, Numidian, and Corinthian, and two notices from the surgeon of the steamship Lake Superior, that measles had occurred on board these steamships prior to their arrival at Canadian ports,—the cases being landed at Dominion Quarantine, Grosse Isle—and giving names and destinations of immigrants on board intending to settle in Michigan. Copies of these notices, including the lists of the names of the immigrants, were made on blanks, designed in this office for this purpose, and promptly sent from this office to the health officers of the jurisdictions where the immigrants intended to settle.

The purpose of such action is to aid the local health officials in preventing outbreaks of dangerous communicable diseases, and, as a matter of fact, this method of forewarning the health officials of the localities where possibly infected immigrants are destined to settle has been productive of good results, and in recent years while these measures have been in use, very few outbreaks have been traced to immigrants.

During the year 1900 there were but three outbreaks reported from jurisdictions where possibly infected immigrants were reported destined to settle which occurred at or near the date of their arrival, and where the contagium was not reported as traced to some other source. From Little Traverse township, Emmet county, an outbreak was reported traced to "Immigration," but no notice was received at this office of immigrants intending to settle in this locality.

The reports of health officers throughout the State show that the great difficulty experienced in restricting this disease lies in the mistaken idea, so generally prevalent, that measles is not to be dreaded in childhood, but, rather, to be sought. And in mild cases no physician is employed, no reports made, and consequently, no effort made to prevent its spread. Many health officers state that their compensation is not sufficient to allow them to seek out all neglected cases, fumigate premises, and bring the offenders to justice. While in many instances this disease is very mild in character, there are many who suffer throughout life from the after effects of the disease. Consumption and other diseases of the respiratory organs, sometimes follow measles. Aside from the diseases induced by measles, and the trouble and suffering caused by so many cases of sickness from this disease, statistics show that the mortality from it warrants vigorous means for the prevention of its spread.

The State Board of Health, by its systems of widespread education, is making earnest efforts to instruct the people generally as to the character of this disease, that it is a dangerous communicable disease, and, as such, can be and ought to be restricted.

Estimated number of outbreaks and cases of measles prevented and lives saved by isolation and disinfection.—Tables 7 and 8 and the accompanying diagram compare the average numbers of cases and deaths in outbreaks of measles where the measures of isolation and disinfection, prescribed by the Michigan State Board of Health, were enforced, with the average numbers of cases and deaths in those outbreaks where these measures were neglected.* By Table 8 it may be seen that during the eleven years, 1890-1900, there were about sixteen times as many cases per outbreak in those outbreaks in which these measures were neglected as in those outbreaks in which they were enforced.

By Table 7 it may be seen that during the year 1900 there were reported to the office of the State Board of Health 899 outbreaks of measles, with 15,492 cases, including 194 deaths.† Had no efforts at restriction been made, and had the average numbers of cases and deaths per outbreak remained the same as in the column headed, "Isolation and disinfection both neglected," there would have occurred 24,812 cases, including 333 deaths, and taking from these respectively the cases (15,492), including deaths (194) which did occur, leaves 9,320 cases, including 139 deaths, indicated as prevented in these 899 outbreaks, by isolation and disinfection. By the same method for each year the indicated saving in the 5,203 outbreaks which occurred during the eleven years, 1890-1900, is 138,216 cases, including 1,131 lives. This is shown in Table 8.

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* In the compilation of the reports for Tables 7 and 8 and the diagram showing the results obtained by isolation and disinfection, every effort has been made to place the numbers of cases and deaths in each outbreak in the proper columns. If, for instance, there were only one or two cases in an outbreak and the health officer neglected to isolate or disinfect, but for some reason the disease spread no further, the number of cases and deaths were placed in the column headed "Isolation and disinfection both neglected." If, on the other hand, as often occurs, quite a number of persons are exposed at the same time and place outside the health officer's jurisdiction, and by proper isolation and disinfection he succeeds in confining the disease to the original cases exposed, they are placed in the column headed, "Isolation and disinfection enforced." If, however, he neglects to properly isolate and disinfect, the whole number of these cases and deaths are placed in the "neglected" column. It is to be regretted that many of the reports received at this office do not state exactly what was done to restrict the disease, or are not sufficiently definite to enable the compilers to decide just what was done, and they are obliged to place all such in the column headed, "Isolation or disinfection or both not mentioned, or statements doubtful."

† *Definition of outbreak.*—For studying the influence of isolation and disinfection in restricting outbreaks of communicable diseases, an outbreak is considered as the existence of one or more cases of a particular communicable disease within any health officer's jurisdiction, whether city, village, or township. All cases of the disease occurring within the jurisdiction during the outbreak are considered as part of the outbreak, unless the contagium cannot be traced to cases within the jurisdiction, and can be clearly traced to cases outside of the jurisdiction, in which instance they are considered as constituting a separate outbreak. When a period of over sixty days has elapsed since the last case (in a given jurisdiction) died or recovered, the outbreak is considered as ended,—unless new cases occur the contagium of which can be traced back to the preceding cases, in which instance the latter cases are considered as part of the same outbreak. Possibly the sixty-day limit may, at some future time, be changed to ninety days; but in order to study the subject systematically, there must be a limit in time, as also in area. Also, comparisons of *years* require that outbreaks be counted as closed, at the end of the *year;* while in comparing *outbreaks* for testing the value of isolation and disinfection it is necessary to take *complete outbreaks,* even where they extend from one year into the next. This explains any apparent discrepancy between the numbers of outbreaks, cases and deaths here given and the numbers given at the beginning of this article.

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TABLE 7.—MEASLES IN MICHIGAN IN 1900. *Exibiting the average numbers of cases and deaths per outbreak:—(1) in all the 899 outbreaks reported; (2) in the 315 outbreaks in which it is doubtful whether or not disinfection or isolation was enforced; (3) in the 7 outbreaks in which disinfection was enforced and isolation doubtful; (4) in the 53 outbreaks in which isolation was enforced and disinfection was doubtful; (5) in the 30 outbreaks in which disinfection was enforced and isolation neglected; (6) in the 84 outbreaks in which isolation was enforced and disinfection neglected; (7) in the 338 outbreaks in which isolation and disinfection were both neglected; (8) in the 72 outbreaks in which isolation and disinfection were both enforced.*

	(1) All outbreaks. (899 outbreaks.*)		(2) Isolation or disinfection or both not mentioned, or statements doubtful. (315 outbreaks.)		(3) Disinfection enforced —isolation doubtful. (7 outbreaks.)		(4) Isolation enforced — disinfection doubtful. (53 outbreaks.)		(5) Disinfection enforced —isolation neglected. (30 outbreaks.)		(6) Isolation enforced — disinfection neglected. (84 outbreaks.)		(7) Isolation and disinfection both neglected. (338 outbreaks.)		(8) Isolation and disinfection both enforced. (72 outbreaks.)	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals....	15,492	194	4,845	52	86	1	220	5	311	4	364	7	9,330	124	336	1
Averages	17.23	.22	15.38	.17	12.29	.14	4.15	.94	10.37	.13	4.33	.83	27.60	.37	4.67	.01

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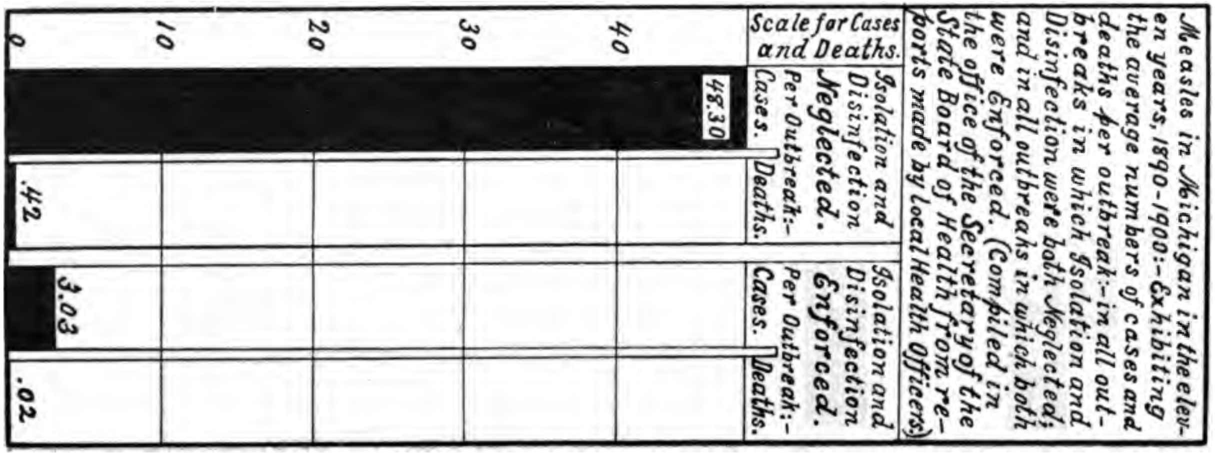
* A definition of the term "outbreak," and the facts relative to methods of compilation of outbreaks, are printed in foot-notes on page 205.

ISOLATION AND DISINFECTION RESTRICT MEASLES.



[PLATE IIII]

TABLE 8.—*Exhibiting for the 11 years, and for each of the 11 years 1890-1900, the numbers of reported outbreaks, cases and deaths from measles; also for this 11-year period, the average number of cases and deaths per outbreak in all outbreaks; in those outbreaks in which isolation or disinfection or both were doubtful; isolation and disinfection both neglected; isolation and disinfection both enforced; and, also, the numbers of cases and deaths indicated as having been prevented by isolation and disinfection.*

Years.	All outbreaks.			Isolation or disinfection, or both, not mentioned, or statements doubtful.			Isolation and disinfection neglected.			Isolation and disinfection enforced.			Cases and deaths indicated as having been prevented by isolation and disinfection.*	
	Outbreaks.	Cases.	Deaths.	Outbreaks.	Cases.	Deaths.	Outbreaks.	Cases.	Deaths.	Outbreaks.	Cases.	Deaths.	Cases.	Deaths.
1890	419	11,189	103	353	6,326	59	57	4,819	44	6	19	0	24,233	220
1891	392	12,338	118	309	6,492	59	71	5,920	63	11	27	0	20,347	231
1892	236	4,406	67	187	2,427	45	31	1,953	22	7	8	0	10,462	101
1893	357	5,440	71	238	2,569	53	70	2,681	14	10	24	0	8,233	0
1894	358	7,345	49	246	4,190	42	70	2,971	7	13	32	0	7,849	0
1895	269	4,462	13	152	2,660	7	56	1,563	6	25	72	0	3,043	14
1896	399	17,068	158	177	4,178	26	146	12,626	131	21	54	0	17,438	201
1897	766	26,458	147	313	7,027	44	324	18,653	101	46	112	0	17,641	90
1898	512	9,318	101	219	2,683	47	165	6,150	49	49	118	2	9,764	53
1899	596	12,351	150	201	3,122	48	230	8,582	89	60	168	3	9,886	82
1900	899	15,492	194	315	4,845	52	338	9,330	124	72	336	1	9,320	139
Totals for the eleven years, 1890-1900	5,203	125,867	1,171	2,710	46,519	482	1,558	75,248	650	320	970	6	†138,216 †125,438	1,131 1,014
Annual averages for the eleven years, 1890-1900	473	11,442	106	246	4,229	44	142	6,841	59	29	88	.5	12,565	103
Av. cases and deaths per outbreak, 1890-1900	....	24.19	.23	....	17.17	.18	....	48.30	.42	....	3.03	.02	....	....

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* The numbers of cases and deaths in this double column are found by multiplying "All outbreaks" for each year by the average number of cases or deaths per outbreak, in those outbreaks in which isolation and disinfection both were neglected, for that year, and deducting from the results thus obtained, the cases or deaths, as the case may be, which were *reported* to have occurred that year, to learn the numbers that would have occurred if efforts for the restriction of the disease had not been made. The instances in which isolation and disinfection were enforced are still so few that the evidence is not yet very satisfactory. † The two sets of numbers appearing in this column are based on two distinct methods of solution which are explained as follows: (1) The 138,216 cases, including 1,131 deaths, are totals of the columns representing cases and deaths saved as explained in the * foot-note; (2) the 125,438 cases, including 1,014 deaths, are obtained by multiplying the average numbers of cases and deaths per outbreak for the eleven years, 1890-1900 (48.30 and .42 where isolation and disinfection were neglected) by the total number of outbreaks to find the numbers which would have occurred if all outbreaks had been neglected, and subtracting therefrom the numbers of cases and deaths that were reported as having occurred during the eleven-year period.

Period of incubation of measles.—The average of the 299 reported periods of incubation is about 11.1 days. The greatest number of cases in any one period was in the fourteen-day period. Further details are in Table 9.

TABLE 9.—*Exhibiting the reported period of incubation, stated in days, in 299 instances of measles. Compiled from reports of health officers in Michigan for the year 1900.*

Incubation period—days	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	20	21	23	26
Cases in each period	1	3	2	*2	†6	5	‡29	§11	¶39	‖64	9	**28	††5	‡‡67	6	§§7	1	¶¶6	‖‖6	1	1

* In 1 instance, reported as *about* 4 days. † In 3 instances, reported as *about* 5 days. ‡ In 9 instances, reported as *about* 7 days. § In 5 instances, reported as *about* 8 days. ¶ In 16 instances, reported as *about* 9 days. || In 32 instances, reported as *about* 10 days. ** In 10 instances, reported as *about* 12 days. †† In 2 instances, reported as *a out* 13 days. ‡‡ In 26 instances, reported as *about* 14 days. §§ In 1 instance, reported as *about* 16 days. ¶¶ In 1 instance, reported as *about* 20 days. |||| In 2 instances, reported as *about* 21 days.

Ages of greatest prevalence of, and mortality from measles.—The reports of local health officials in Michigan, for the year 1900, stated the ages of 8,180 persons who were sick with measles, including the ages of 241 persons who died of that disease.

TABLE 10.—*Exhibiting in certain age-groups, the number of cases and the number of deaths from measles; the per cent that the cases in each group were of all cases of known ages, the per cent that the deaths in each group were of all deaths at known ages; and the per cent that the deaths in each group were of the cases in that group. Compiled from all reports for the year 1900, which stated the ages.*

	Number and per cent of cases and deaths in certain age-groups.																	
Ages in groups of years.	All ages known.	Under 1.	1.	2.	3.	4.	Under 5.	5–9.	10–14.	15–19.	20–24.	25–29.	30–34.	35–39.	40–44.	45–49.	50–54.	55–59.	60 and over.
No. of cases*	8,180	193	348	430	526	521	2,018	3,019	1,307	813	428	201	149	115	64	29	21	8	8
Per cent the cases in each group were of all cases of known ages	100	2.4	4.3	5.3	6.4	6.4	24.7	36.8	16.0	9.9	5.2	2.5	1.8	1.4	.8	.4	.3	.1	.1
No. of deaths*	241	51	52	24	12	10	149	29	12	16	6	8	8	4	4	1	0	3	1
Per cent the deaths in each group were of cases in that group	2.9	26.4	14.9	5.6	2.3	1.9	7.4	1.0	.9	2.0	1.4	4.0	5.4	3.5	6.3	3.4	0	37.5	12.5
Per cent the deaths in each group were of all deaths, at known ages	100	21.2	21.6	10.0	5.0	4.2	61.8	12.0	5.0	6.6	2.5	3.3	3.3	1.7	1.7	.4	0	1.2	.4
Per cent the deaths in special groups were of all deaths, known ages	....	61.8					.....	23.7			12.4					2.1			

* Does not include those cases or deaths where the age was not stated.

There are two erroneous and very harmful beliefs, quite prevalent among parents,—that measles cannot ultimately be escaped any more than teething and that the least dangerous time for persons to have the disease is while quite young children. Whatever ground there may be for these beliefs elsewhere, reports to this office, as may be seen in tabulated form in Tables 10, 11, 12, 13, and 14, of this article, show that none exists in Michigan; but that, on the contrary, facts here bear evidence that measles is a preventable disease; and that it is *more* fatal to very young children than to persons in middle age.

Table 10 shows that for the year 1900, 61.8 per cent of all deaths from this disease was in children under five years of age. Table 11 shows that for a period of eight years, 1892-99, 60.6 per cent of all deaths from measles was in children under five years old.

TABLE 11.—*Exhibiting in certain age-groups, the number of cases and number of deaths from measles in the year 1900, and the averages for the 8 years, 1892-99; the per cent that the cases in each group were of all cases; the per cent that the deaths in each group were of all deaths. (Compiled from all reports which stated the ages.)*

Year.		Total number included.	Per cent of cases and deaths in certain age-groups.													
			All ages.	Under 5.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 to 54.	55 to 59.	60 years and over.
1900.	Cases......	8,180	100	24.7	36.8	16.0	9.9	5.2	2.5	1.8	1.4	.8	.4	.3	.1	.1
	Deaths.....	241	100	61.8	12.0	5.0	6.6	2.5	3.3	3.3	1.7	1.7	.4	0	1.2	.4
1892-99.	Cases......	34,019	100	24.3	41.5	16.0	7.9	4.3	2.2	1.6	1.0	.6	.3	.1	.1	.1
	Deaths.....	431	100	60.6	13.2	7.9	5.6	3.2	3.2	.9	2.1	1.4	.9	.9	0	.5

TABLE 12.—*Exhibiting, by sex, the per cent of persons in certain age-groups who recovered from measles, in Michigan, during the year 1900, and the averages for the 7 years 1893-99; also the average age and the number of cases included. (Compiled from such reports as stated the ages.)*

Year.	Sex.	Average age of persons who recovered—years.	No. of cases included.	Age.—In periods of years. Per cent of (non-fatal) cases in each period.													
				All ages.	Under 5 years.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 to 54.	55 to 59.	60 years and over.
1900.	Males.....	10.3	4,094	100	24.1	37.2	16.4	9.3	5.9	2.8	1.8	1.1	.7	.2	.2	.1	.1
	Females...	10.4	3,845	100	22.9	38.2	16.2	10.8	4.7	2.1	1.7	1.7	.9	.5	.3	.03	.1
1893-99.	Males......	9.3	16,390	100	23.9	43.1	15.4	7.6	4.6	2.2	1.4	.9	.5	.2	.1	.04	.1
	Females...	9.7	16,446	100	23.9	41.2	16.6	8.0	4.0	2.1	1.8	1.1	.6	.3	.1	.1	.1

TABLE 13.—*Exhibiting, by sex, the per cent of persons in certain age-groups who died of measles during the year 1900, and the averages for the seven years, 1893-99.*

Year.	Sex.	Average age of decedents—years.	No. of deaths included.	Per cent of deaths in certain age-groups.										
				All ages.	Under 5.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 years and over.
1900.	Males.........	7.4	120	100	60.0	15.8	5.0	7.5	2.5	3 3	1.7	.8	1.7	1.7
	Females......	9.2	121	100	63.6	8.3	5.0	5.8	2.5	3.3	5.0	2.5	1.7	2.5
1893-99.	Males.........	6.7	180	100	62.8	13.3	6.7	7.2	4.4	2.2	0	1.1	1.7	.6
	Females......	8.7	217	100	62.7	9.2	7.4	5.1	2.8	3.7	1.8	3.2	1.4	2.8

Case-mortality rates from reported measles at the different ages.—For the reason explained previously in this article, the reports of *deaths* from measles since 1898, are probably accurate. This fact should be considered in reference to the case-mortality rates, or fatality, from measles, as shown in Table 14.

Great difficulty has been experienced in obtaining reports of *cases* of measles, and, while there has been much improvement each year in reports of this disease, a large number of the cases are not yet reported.

The total number of cases in which the ages were given, for the period of eleven years, 1890-1900, was 47,509 cases, of which number 721 were fatal cases,—giving a fatality, or case-mortality rate, for this period of years, of persons at all ages, of 1.5 of one death per 100 cases of measles.

Table 14 shows that the fatality from this disease for eleven years, 1890-1900, was greatest in children under one year of age; in children under five years of age the fatality was over seven times the fatality in children from five to nine years old, this having been the age-period of lowest fatality. The fatality generally having increased from this age-period up to old age, having been especially high after fifty-five years of age.

TABLE 14.—*In certain age-groups, the numbers of cases and deaths from measles in the 11 years, 1890-1900, and the per cent that the deaths in each group were of the cases in that group. (Compiled from all the reports to the Secretary of the State Board of Health for the years 1890-1900, which stated the ages.)*

	Under 1 year.	Under 5.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 to 54.	55 to 59.	60 to 64.	65 and over.
Cases—1890-1900...	801	11,499	19,072	7,741	4,044	2,200	1,070	786	534	289	140	59	29	24	22
Deaths—1890-1900.	139	433	95	48	46	23	22	14	14	11	6	2	3	2	2
Per cent..........	17.4	3.8	.5	.6	1.1	1.0	2.1	1.8	2.6	3.8	4.3	3.4	10.3	8.3	9.1

Average duration of measles.—Fatal and non-fatal cases.—The average duration of sickness from measles in non-fatal cases during the years, 1892-1899, was 12.3 days for both males and females. The average duration of fatal cases during this period of years was 9.2 days for males and 10.6 for females.

TABLE 15.—*Exhibiting, by sex of patient, the duration (in days) of fatal cases of sickness from measles, in Michigan, during the year 1900, and the averages for the 8 years, 1892-99. Per cent of deaths arranged in five-day groups. (Compiled from those reports which stated the length of time the patient was sick.)*

Fatal cases of measles.											
Year.	Sex.	No. of deaths included.	Duration of sickness:—Per cent of deaths in each period of days.								
			All deaths.	1 to 5.	6 to 10.	11 to 15.	16 to 20.	21 to 25.	26 to 30.	31 to 35.	36 and over.
1900.	Males	44	100	31.8	36.4	13.6	11.4	2.3	4.6	0	0
	Females	52	100	42.3	32.7	15.4	3.9	3.9	1.9	0	0
1892-99.	Males	113	100	35.4	37.2	8.8	12.4	1.8	3.5	0	.9
	Females	143	100	34.3	32.2	18.2	5.6	3.5	2.1	.7	3.5

TABLE 16.—*Exhibiting, by sex of patient, by per cent of cases which recovered in specified periods of time, the duration (in days) of non-fatal cases of sickness from measles in Michigan, during the year 1900, and the averages for the 8 years, 1892-99. Per cent of cases arranged in five-day groups. (Compiled from those reports which stated the length of time the patient was sick.)*

Non-fatal cases of measles.															
Year.	Sex.	No. of cases included.	Duration of sickness:—Per cent of cases in each period of days.												
			All periods.	1 to 5 days.	6 to 10.	11 to 15.	16 to 20.	21 to 25.	26 to 30.	31 to 35.	36 to 40.	41 to 45.	46 to 50.	51 to 55.	56 days and over.
1900.	Males	3,460	100	4.0	31.0	26.6	12.3	20.8	2.1	1.4	.9	.6	.2	0	.1
	Females	3,322	100	3.6	30.3	26.5	12.6	22.3	1.9	.8	.8	.3	.3	.3	.2
1892-99.	Males	10,932	100	6.5	38.3	39.8	8.6	3.3	1.6	.7	.4	.3	.1	.1	.2
	Females	10,927	100	6.3	37.5	41.1	8.5	3.5	1.6	.6	.4	.2	.2	.04	.1

Proportion of measles in the different months of the year 1900.—Table 17 exhibits evidence, from two sources, on the proportion of measles reported in each month of the year 1900, namely, the sickness-statistics and the contagious-disease statistics. The *first* line states the per cent of all weekly postal-card *reports,* made by physicians in active general practice, which reported the presence of measles under their observation. The *second* line states the average per cent of all these *reporters* who stated the presence of measles. The *third* line states the average order of prevalence of measles in the list of diseases reported. The *fourth* line represents the *prevalence* of measles, according to the sickness-statistics, being a combination of the first and third lines of this table (the method of combining them is explained on pages 122-3 of the annual report of this Board for the year 1890). In this fourth line the smallest numbers indicate the greatest prevalence,—for instance, June is 1 or *first* in prevalence,—more measles in June than in any other month; March is 2 or *second* in prevalence; April is 3 or *third* in prevalence; and so on. The *fifth* line represents by months the number of outbreaks of measles reported to this office by health officers, including only the reports which gave the months in which the outbreaks began—reports of thirty-three outbreaks did not give dates, and seventy-two outbreaks began in 1899, and, of course, those outbreaks could not be included in this line.

The evidence of the sickness-statistics, summarized in the fourth line of this table (17) indicates that the maximum prevalence of measles in Michigan in 1900 occurred in June, and the minimum where sickness was reported present was in December. The fifth line of the table, which is based on the contagious-disease statistics, indicates that the maximum number of reported outbreaks occurred in March and the minimum in September. This evidence is only for a single year, and might, therefore, be exceptional. In Table 14, in the article on sickness statistics on a preceding page of this annual report for 1901, is a statement of the average per cent of weekly card reports stating the presence of measles by months for the ten years, 1890-99, from which it appears that the maximum occurs in May, and the minimum in September and October.

TABLE 17.—*Measles in Michigan during the year 1900, exhibiting, by months, the per cent of all weekly card-reports received which stated the presence of measles; the average per cent of all observers reporting weekly who reported measles; the average order of prevalence of measles where it was present; the prevalence of measles, according to the sickness statistics, and the number of outbreaks of measles reported by health officers.*

1900.	Year.	Jan.	Feb.	Mar.	Apr.	May·	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Per cent of weekly card reports stating presence of measles..........	13	15	19	31	28	25	23	14	6	4	4	3	4
Average per cent of observers who reported measles present............	23	26	31	36	44	50	36	25	13	7	9	5	6
Average order of prevalence where present............	2.4	2.5	2.2	2.4	2.4	2.2	1.8	2.0	2.7	3.7	2.8	3.2	3.7
Prevalence*.........	(8)	7	5	2	3	4	1	6	8	11	9	10	12
Outbreaks†..........	857	136	109	148	135	99	81	56	23	13	16	18	23

* According to the sickness-statistics, as explained in the text accompanying this table. In the fourth line of figures in this table, the smallest numbers indicate the greatest prevalence.

† The numbers in this line show the numbers of outbreaks which began each month.

WHOOPING-COUGH IN MICHIGAN DURING THE YEAR ENDING DECEMBER 31, 1900.

During the year ending December 31, 1900, there were reported to the Secretary of the State Board of Health, 294 outbreaks of whooping-cough in 274 localities in Michigan, which resulted in 3,397 cases,[*] including 177 deaths.

Excluding Detroit, from which only the twenty-two fatal cases were reported, the average number of cases per locality, in 1900, was 12.36; the average number of deaths per locality was .65 of one death; and, excluding Detroit, the fatality from this disease, i. e., the proportion of reported cases which proved fatal, was 4.59 per cent, or about five deaths to 100 cases. If the fatality in Detroit was the same as in the other part of the State, the number of cases there was 479; which if added to the 3,397 cases reported, would have made 3, 876 cases.

The death-rate from this disease for the State, according to the reports to this office, was .73 of one death per 10,000 inhabitants.

Whooping-cough in 1900 compared with previous years.—Table 1 shows that in 1900, as compared with the averages for the thirteen years, 1887-1899, the number of reported cases was 305 less and the reported deaths 72 more. The increase in the reported number of deaths may not indicate a great fatality from this disease in 1900, but only that the fatal cases are being more frequently and carefully reported. There are still cases of whooping-cough in other parts of Michigan than Detroit which are not reported; in many instances the fatal cases, only, are reported and even not all fatal cases are yet reported to this office, as shown by the fact that for the year 1900 there were reported to the Secretary of State 208 deaths from whooping-cough, while only 177 were reported to the Secretary of the State Board of Health.

TABLE 1.—*Whooping-cough in Michigan in 1900, and the total and average for the 13 years 1887-99. Exhibiting the numbers of reported cases and deaths and the number of localities in which the presence of the disease was reported, together with the cases and deaths per locality and per 100,000 inhabitants, and the per cent the deaths were of cases. (Compiled from reports received at the office of the Secretary of the State Board of Health.)*

Years.	Cases.	Deaths.	Localities.	Cases per locality.	Deaths per locality.	Cases per 100,000 inhabitants.	Deaths per 100,000 inhabitants.	Per cent deaths were of cases.
1900.......	[†]3,397	177	274	[‡]12.36	.65	[‡]158.10	7.31	[‡]4.59
Totals, 1887-99...	48,129	1,359	2,710	....	....	....	....	....
Av. for 13 years....	3,702	105	208	17.8	.50	168	4.8	2.8

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[*] Throughout this article "cases" include deaths unless the word non-fatal is used.

[†] In numerous instances only the fatal cases were reported to this office.

[‡] Exclusive of Detroit, from which only the twenty-two fatal cases were reported.

Table 1, and comments thereon are based upon reports to the office of the State Board of Health. Exhibit 1, and comments thereon are based upon returns of deaths, made to the Secretary of State. For all years preceding 1898 the statistics of deaths were collected after the close of the year in which they occurred, and it is believed that not all deaths were reported; for all years after 1897 the deaths were recorded before burial, and returns were made to the Secretary of State early in the following month. There is reason to believe that under the new law nearly all deaths are included in the statistics, whereas before 1898 a considerable proportion was omitted. This fact should be held in mind in comparing the deaths reported for the year 1900 with those reported in years previous to 1898, also in comparing the death-rate of 1898 and of 1899 with that for preceding years.

EXHIBIT 1.—*Exhibiting the reported number of deaths from whooping-cough per 100,000 persons living in Michigan in each of the 32 years, 1869-1900. (Compiled from the Secretary of State's Vital Statistics of Michigan. Population estimated by average annual increase.)*

Year.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.
Deaths (per 100,000, etc.)...	13.9	10.1	5.5	15.1	15.6	11.2	7.2	12.4	8.7	8.5	10.2	16.1	8.4	5.0
Year.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.
Deaths (per 100,000, etc.)...	5.2	8.8	7.4	9.7	5.6	8.7	6 8	3.6	7.4	6.7	7.8	7.0	6.1	6.8
Year.	1897.	1898.	1899.	1900.										
Deaths (per 100,000, etc.)...	4.5	12.0	10.0	8.6										

Distribution of whooping-cough by counties in Michigan during 1900.—Table 2 exhibits the distribution of whooping-cough by counties in this State during the year 1900, according to the reports made to the Secretary of the State Board of Health. The table shows the reported numbers of cases and deaths, also the sickness and death-rates from whooping-cough in each county from which the disease was reported.

Sickness and death-rates from reported whooping-cough.—Table 2 shows that the sickness-rate for the State, in 1900, was 15.81 cases per 10,000 population. This rate is exclusive of Detroit, from which only the twenty-two fatal cases were reported,—with a population of 285,704, as estimated for 1900 by the health officer of the city.

The highest sickness-rate, by counties, was in Roscommon county, where the rate was 251.82 cases per 10,000 population. There were 45 cases reported from this county, with a population of only 1,787.

By counties, the lowest sickness-rate, .30 of one case per 10,000 population, was in Macomb county, from which only one case was reported. Mason county, having a sickness-rate of .53 of one case per 10,000 population, and Washtenaw county, .84 of one case per 10,000 population, had the next lowest sickness-rates.

TABLE 2.—*Numbers of cases and deaths reported from whooping-cough per 10,000 persons living in each county in Michigan during the year 1900. (Compiled from reports of health officers.)*

State and counties.	Population of Michigan for 1900.	Number of reported		Number per 10,000 population of	
		Cases.	Deaths.	Cases.	Deaths.
State	2,420,982	3,375*	177	*15.81	.73
Alcona	5,691	0	0	0	0
Alger	5,868	0	0	0	0
Allegan	38,812	141	3	36.33	.77
Alpena	18,254	0	0	0	0
Antrim	16,568	96	4	57.94	2.41
Arenac	9,821	0	0	0	0
Baraga	4,320	0	0	0	0
Barry	22,514	94	1	41.75	.44
Bay	62,378	21	6	3.37	.96
Benzie	9,685	0	0	0	0
Berrien	49,165	41	7	8.34	1.42
Branch	27,811	10	1	3.60	.36
Calhoun	49,315	117	1	23.73	.20
Cass	20,876	87	2	41.67	.96
Charlevoix	13,956	15	3	10.75	2.15
Cheboygan	15,516	0	0	0	0
Chippewa	21,338	151	1	70.77	.47
Clare	8,360	2	0	2.39	0
Clinton	25,136	54	1	21.48	.40
Crawford	2,943	0	0	0	0
Delta	23,881	101	1	42.29	.42
Dickinson	17,890	27	2	15.09	1.12
Eaton	31,668	102	1	32.21	.32
Emmet	15,931	94	0	59.00	0
Genesee	41,804	18	1	4.31	.24
Gladwin	6,564	0	0	0	0
Gogebic	16,738	21	4	12.55	2.39
Gd. Traverse	20,479	56	3	27.35	1.46
Gratiot	29,889	30	5	10.04	1.67
Hillsdale	29,865	6	0	2.01	0
Houghton	66,063	49	14	7.42	2.12
Huron	34,162	6	0	1.76	0
Ingham	39,818	63	1	15.82	.25
Ionia	34,329	84	4	24.47	1.17
Iosco	10,246	4	0	3.90	0
Iron	8,990	80	6	88.99	6.67
Isabella	22,784	35	2	15.36	.88
Jackson	48,222	20	0	4.15	0
Kalamazoo	44,310	49	6	11.06	1.35
Kalkaska	7,133	8	0	11.22	0
Kent	129,714	212	11	16.34	.85
Counties.					
Keweenaw	3,217	0	0	0	0
Lake	4,957	15	0	30.26	0
Lapeer	27,641	37	1	13.39	.36
Leelanau	10,556	16	2	15.16	1.89
Lenawee	48,406	33	0	6.82	0
Livingston	19,664	373	3	189.69	1.53
Luce	2,983	0	0	0	0
Mackinac	7,703	0	0	0	0
Macomb	33,244	1	1	.30	.30
Manistee	27,856	65	2	23.33	.72
Marquette	41,239	43	3	10.43	.73
Mason	18,885	1	1	.53	.53
Mecosta	20,693	23	1	11.11	.48
Menominee	27,046	4	2	1.48	.74
Midland	14,439	57	3	39.47	2.08
Missaukee	9,308	23	1	24.71	1.08
Monroe	32,754	31	4	9.46	1.22
Montcalm	32,754	76	7	23.20	2.14
Montmorency	3,234	0	0	0	0
Muskegon	37,036	41	1	11.07	.27
Newaygo	17,673	6	1	3.40	.57
Oakland	44,792	26	0	5.80	0
Oceana	16,644	2	0	1.20	0
Ogemaw	7,765	0	0	0	0
Ontonagon	6,197	26	1	41.96	1.61
Osceola	17,859	23	3	12.88	1.68
Oscoda	1,468	0	0	0	0
Otsego	6,175	0	0	0	0
Ottawa	39,667	13	2	3.28	.50
Presque Isle	8,821	0	0	0	0
Roscommon	1,787	45	0	251.82	0
Saginaw	81,222	53	4	6.53	.49
Sanilac	35,055	81	3	23.11	.86
Schoolcraft	7,889	10	0	12.68	0
Shiawassee	33,866	156	7	46.06	2.07
St. Clair	55,228	42	1	7.60	.18
St. Joseph	23,889	15	1	6.28	.42
Tuscola	35,890	33	1	9.19	.28
Van Buren	33,274	30	3	9.02	.90
Washtenaw	47,761	4	0	.84	0
Wayne	348,793	*70	26	*11.1	.75
Wexford	16,845	7	1	4.16	.59

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*Exclusive of Detroit, from which only the twenty-two fatal cases were reported.

TABLE 5.—WHOOPING-COUGH IN MICHIGAN IN 1900: *Exhibiting the average numbers of cases and deaths per outbreak:—(1) in all the 283 outbreaks reported; (2) in the 154 outbreaks in which it is doubtful whether or not disinfection or isolation was enforced; (3) in the 1 outbreak in which disinfection was enforced and isolation doubtful; (4) in the 15 outbreaks in which isolation was enforced and disinfection was doubtful; (5) in the 4 outbreaks in which disinfection was enforced and isolation neglected; (6) in the 4 outbreaks in which isolation was enforced and disinfection neglected; (7) in the 93 outbreaks in which isolation and disinfection were both neglected; (8) in the 12 outbreaks in which isolation and disinfection were both enforced.*

	(1) All outbreaks. (283 outbreaks.)		(2) Isolation or disinfection or both not mentioned, or statements doubtful. (154 outbreaks.)		(3) Disinfection enforced—isolation doubtful. (1 outbreak.)		(4) Isolation enforced—disinfection doubtful. (15 outbreaks.)		(5) Disinfection enforced—isolation neglected. (4 outbreaks.)		(6) Isolation enforced—disinfection neglected. (4 outbreaks.)		(7) Isolation and disinfection both neglected. (93 outbreaks.)		(8) Isolation and disinfection both enforced. (12 outbreaks.)	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals..........	3,127	140	1,209	79	1	1	51	2	13	3	13	2	1,826	51	27	2
Averages.......	11.05	.49	7.85	.51	1.00	1.00	3.40	.13	3.25	.75	3.25	.50	19.63	.55	2.25	.17

Estimated number of outbreaks and cases of whooping-cough prevented and lives saved by isolation and disinfection.—Comparisons are made in Table 5, of the average numbers of cases and deaths in outbreaks of whooping-cough where the measures of isolation and disinfection prescribed by the Michigan State Board of Health, were enforced, with the average numbers of cases and deaths in outbreaks where these measures were neglected.[*]

By this table (5) it may be seen that during the year 1900 there were reported to the office of the State Board of Health, 283[†] outbreaks of whooping-cough, with 3,127 cases, including 140 deaths. Had no efforts at restriction been made, and had the average number of cases and deaths per outbreak remained the same as in the column headed "Isolation and disinfection both neglected," there would have occurred 5,555 cases, including 156 deaths. Had the average numbers of cases and deaths in all outbreaks been the same as those in the column headed "Isolation and disinfection both enforced," there would have occurred only 637 cases, including 48 deaths, or 2,490 cases of sickness, including 92 deaths, from whooping-cough would have been prevented.

Period of incubation in whooping-cough.—The average period of incubation in the twenty-five reported instances is twelve days; the greatest number of instances given in any single period was in the fourteen-day period.

TABLE 6.—*Exhibiting the reported period of incubation, stated in days, in 25 instances of whooping-cough. Compiled from reports of health officers in Michigan, for the year 1900.*

Incubation period—days	7	8	9	10	12	14	21
Instances in each period	[*]1	[†]1	[‡]5	[§]7	[¶]1	[‖]8	[**]2

[*] In this instance, reported as about 7 days. [†] In this instance, reported as about 8 days. [‡] In 3 of these instances, reported as about 9 days. [§] In 3 of these instances, reported as about 10 days. [¶] In 1 of these instances, reported as about 12 days. [‖] In 3 of these instances, reported as about 14 days. [**] In 1 of these instances, reported as about 21 days.

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[*] In the compilation of the reports for Table 5 showing the results obtained by isolation and disinfection, every effort has been made to place the numbers of cases and deaths in each outbreak in the proper columns. If, for instance, there were only one or two cases in an outbreak and the health officer neglected to isolate or disinfect, but for some reason the disease spread no further, the number of cases and deaths were placed in the column headed, "Isolation and disinfection both neglected." If, on the other hand, as often occurs, quite a number of persons are exposed at the same time and place outside the health officer's jurisdiction, and by proper isolation and disinfection he succeeds in confining the disease to the original cases exposed, they are placed in the column headed, "Isolation and disinfection enforced." If, however, he neglects to properly isolate or disinfect, the whole number of these cases and deaths are placed in the "neglected" column. It is to be regretted that many of the reports received at this office do not state exactly what was done to restrict the disease, or are not sufficiently definite to enable the compilers to decide just what was done, and they are obliged to place all such in the column headed, "Isolation or disinfection or both not mentioned; or statements doubtful."

[†] Whenever a break of sixty days or more has occurred in the progress of a communicable disease in a given township, village or city it has been regarded as two different outbreaks, but if the second appearance of the disease could be traced from the first the intermission was disregarded and it was treated as a single outbreak. Also, comparisons of *years* require that outbreaks be counted as closed at the end of the *year;* while in comparing *outbreaks* for testing the value of isolation and disinfection it is necessary to take *complete outbreaks,* even where they extend from one year into the next. This explains the apparent discrepancy between the number of outbreaks here given and the number given at the beginning of this article.

*Ages of greatest prevalence of, and mortality from whooping-cough.**—From Table 7 it may be seen that ninety-one per cent of all the sickness, and one hundred per cent of all the deaths from whooping-cough occurred in children under ten years of age; that the fatality from this disease was greatest in children under one year old—seventy-five per cent of the reported cases of that age having proved fatal; and, also, that sixty-five per cent of all deaths from this disease were in children under one year old.

TABLE 7.—*Exhibiting in certain age-groups, the numbers of cases and deaths from whooping-cough, the per cent that the cases in each group were of all cases of known ages; the per cent that the deaths in each group were of all deaths at known ages; and the per cent that the deaths in each group were of the cases in that group. Compiled from all reports for the year 1900, which stated the ages.*

	Number and per cent of cases and deaths in certain age-groups.*																
Ages in groups of years.	All known ages.	0–1.	1–2.	2–3.	3–4.	4–5.	Under 5.	5–9.	10–14.	15–19.	20–24.	25–29.	30–34.	35–39.	40–44.	45–49.	50 and over.
No. of cases†	712	141	78	68	80	66	433	217	46	9	3	0	2	0	1	1	0
Per cent the cases in each group were of all cases of known ages	....	20	11	10	11	9	61	31	6	1	.4	0	.3	0	.1	.1	0
No. of deaths	164	106	28	11	7	5	157	7	0	0	0	0	0	0	0	0	0
Per cent the deaths in each group were of all cases in that group	23	75	36	16	9	8	36	3	0	0	0	0	0	0	0	0	0
Per cent the deaths in each group were of all deaths, known ages	....	65	17	7	4	3	96	4	0	0	0	0	0	0	0	0	0
Per cent the deaths in special groups were of all deaths, known ages	....	96					100										

Table 9, shows that all the deaths from whooping-cough were in children under ten years of age; of these, ninety-five per cent of the females and ninety-seven per cent of the males were under five years.

The average age of non-fatal cases of whooping-cough in 1900 was 5.3 years for males and 5.3 for females; for fatal cases the average age was 1.1 years for males and 1.3 for females.

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* In dividing the ages into five-year periods, the first period includes all ages from birth to five years, or all under five years of age. The second five-year period includes all ages of five years and over and less than ten years. In each succeeding period the same arrangement is followed.

† Includes deaths from this disease.

TABLE 8.—*Exhibiting, by sex, the per cent of persons in certain age-groups who recovered from whooping-cough, in Michigan, during the year 1900; also the average age and the number of cases included. (Compiled from such reports as stated the ages.)*

Year.	Sex.	Average age of persons who recovered, years.	No. of cases included.	Age.—In periods of years. Per cent of (non-fatal) cases in each period.*										
				All ages.	Under 5 years.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 and over.
1900.	Males	5.3	266	100	51	39	7	2	.4	0	0	0	.4	.4
	Females	5.3	282	100	50	38	9	1	.7	0	.7	0	0	0

TABLE 9.—*Exhibiting, by sex, the per cent of persons in certain age-groups who died of whooping-cough during the year 1900.*

Year.	Sex.	Average age of decedents.	No. of deaths included.	Per cent of deaths in certain age-groups.*					
				All ages.	Under 5.	5 to 9.	10 to 14.	15 to 19.	20 to 24.
1900.	Males	1.1	73	100	95	5	0	0	0
	Females	1.3	91	100	97	3	0	0	0

* On a preceding page, a foot-note to the side head under which this table appears, explains these age-groups.

TABLE 10.—*Exhibiting, by sex of patient, the duration (in days) of fatal cases of sickness from whooping-cough, in Michigan, during the year 1900. Per cent of deaths arranged in five-day groups. (Compiled from those reports which stated the length of time the patient was sick.)*

Fatal cases of whooping-cough.												
Year.	Sex.	No. of deaths included.	Duration of sickness:—Per cent of deaths in each period of days.									
			All periods.	1 to 5 days.	6 to 10.	11 to 15.	16 to 20.	21 to 25.	26 to 30.	31 to 35.	36 and over.
1900.	Males	33	100	12	33	6	6	21	6	0	15
	Females	45	100	16	20	11	13	20	7	2	11

Table 2 also shows that the death-rate for the State in 1900 was .73 of one death per 10,000 population.

The highest death-rate, by counties, was in Iron county, 6.67 deaths per 10,000 population.

From fourteen counties from which sickness from whooping-cough was reported there were no deaths reported from this disease.

The lowest death-rate, from counties from which deaths were reported, was in St. Clair county, .18 of one death per 10,000 population. Calhoun and Genesee counties, having death-rates of .20 and .24 of one death per 10,000 population, were next lowest.

Whooping-cough in each month of the year, 1900.—From Table 3 it appears that the prevalence of whooping-cough is quite uniform throughout the year. A study of Table 14, of the article on "Sickness Statistics" in this report, shows that whooping-cough, according to the weekly card-reports made to this office, during the ten years, 1890-99, varied but little in the different months; the *lowest* monthly average of reports which stated the presence of whooping-cough was 6 per cent of all reports received, while the *highest* monthly average was only 10 per cent. The general monthly average for the ten years was 8 per cent.

TABLE 3.—*Exhibiting the reported number of outbreaks of whooping-cough which were present, in each month of the year 1900, in the different local jurisdictions of Michigan.*

Months	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Outbreaks present	75	73	67	64	66	85	79	73	62	45	37	36

Source of contagium of whooping-cough and how the disease is spread.—Of the 3,397 cases of whooping-cough reported, during the year 1900, as exhibited in Table 4, the local health officers reported the source of contagium as follows: Traced to a former case, 583; from outside jurisdiction, 374; probably from outside jurisdiction, 13; unknown, 1,248; not stated or indefinitely reported, 1,179; total, 3,397.

TABLE 4.—*Reported source of contagium of cases of whooping-cough, in 1900.*

Traced to a former case	583
Contagium reported as from outside jurisdiction	374
Contagium reported as probably from outside jurisdiction	13
Unknown or reports not definite (includes those reported "Contagium," "Sporadic," "Spontaneous," "*De Novo*," etc.)	1,248
Not stated (including cases reported by registrars to Secretary of State and not reported to this office)	1,179
All cases	3,397

Outbreaks of whooping-cough reported traced to previous outbreaks.—According to reports of local health officers in Michigan the contagium of whooping-cough in forty-four outbreaks, with an aggregate of 591 cases, including eighteen deaths, was traced to outside jurisdictions. From two of these second localities the contagium was permitted to spread to other localities resulting in seventy-nine cases. Eight outbreaks were reported as *probably* traced to preceding outbreaks.

Nine outbreaks, with an aggregate of one hundred cases, including one death, were traced to places outside of Michigan.

Transgression of the public health laws.—Strict isolation and disinfection enforced in the 283 outbreaks of whooping-cough would have lessened to a considerable degree the number of cases and deaths from the disease in 1900, and the carelessness on the part of the people generally approaches criminality. Such carelessness must be due to ignorance of the importance of the disease, for whooping-cough, for the past six years, has caused more deaths in Michigan than either scarlet fever or measles,* and when this information has become sufficiently familiar to the people of the State, and the vital necessity of the isolation and disinfection of the disease is fully understood, then coöperation may be expected, and a diminution of the number of cases and deaths from whooping-cough may be expected.

The following quotations from reports of local health officers show some of the difficulties experienced by health officers in restricting this disease:—

> "Pertussis has been in this vicinity for some months. How or whence it came, I am unable to say. People rarely call in a doctor and to control it would require a guard stationed at every house, for if it does not come to them, they will go where it is."—*Dr. J. H. Bennett, Health Officer Evangeline Township, Charlevoix Co.*
>
> "Whooping-cough is prevalent and the utmost laxity in regard to isolation prevails—children sick with the disease attending school and places of amusement, etc."—*Dr. C. L. Sigler, Marion Township, Livingston Co.*
>
> "Relative to the prevalent epidemic of whooping-cough, I will state that it would require mounted police to restrain all the persons affected. Now this epidemic started in Antrim county, near town, over a year ago (outside of my jurisdiction), and by the time it got into Shiawassee township there were a large number of cases."—*Dr. T. N. Yeomans, Health Officer Bancroft Village, Shiawassee Co.*
>
> "People in the village seem inclined to treat the disease as nothing to worry about. People at the P. O. had it—children ran in and out at all times."—*H. C. King, Health Officer Empire Township, Leelanau Co.*

While some of the localities in the State, and a portion of the people, are in sympathy with the modern sanitary thought and the restriction of this disease, and while the conditions shown in the above quotations do not exist in every locality, still reports from various parts of the State show similar difficulties met by local health officers and physicians in restricting this disease.

Table 5 shows that of 283 outbreaks, in 154 of them isolation and disinfection were either not mentioned or the statements were so doubtful as to be impossible of classification; a majority of them were probably neglected; in one outbreak disinfection was enforced and isolation was doubtful; in fifteen outbreaks, isolation was enforced, but disinfection was doubtful; in four outbreaks disinfection was enforced and isolation was neglected; in four outbreaks isolation was enforced and disinfection was neglected; in ninety-three outbreaks isolation and disinfection were both neglected, and out of the 283 outbreaks reported, only twelve were reported as enforced. The results of the different modes of action are shown in Table 5.

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*According to the returns made to the Secretary of State.

TABLE 5.—WHOOPING-COUGH IN MICHIGAN IN 1900: *Exhibiting the average numbers of cases and deaths per outbreak:—(1) in all the 283 outbreaks reported; (2) in the 154 outbreaks in which it is doubtful whether or not disinfection or isolation was enforced; (3) in the 1 outbreak in which disinfection was enforced and isolation doubtful; (4) in the 15 outbreaks in which isolation was enforced and disinfection was doubtful; (5) in the 4 outbreaks in which disinfection was enforced and isolation neglected; (6) in the 4 outbreaks in which isolation was enforced and disinfection neglected; (7) in the 93 outbreaks in which isolation and disinfection were both neglected; (8) in the 12 outbreaks in which isolation and disinfection were both enforced.*

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)	
	All outbreaks.		Isolation or disinfection or both not mentioned, or statements doubtful.		Disinfection enforced - isolation doubtful.		Isolation enforced—disinfection doubtful.		Disinfection enforced—isolation neglected.		Isolation enforced—disinfection neglected.		Isolation and disinfection both neglected.		Isolation and disinfection both enforced.	
	(283 outbreaks.)		(154 outbreaks.)		(1 outbreak.)		(15 outbreaks.)		(4 outbreaks.)		(4 outbreaks.)		(93 outbreaks.)		(12 outbreaks.)	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals..........	3,127	140	1,209	79	1	1	51	2	13	3	13	2	1,826	51	27	2
Averages.......	11.05	.49	7.85	.51	1.00	1.00	3.40	.13	3.25	.75	3.25	.50	19.63	.55	2.25	.17

Estimated number of outbreaks and cases of whooping-cough prevented and lives saved by isolation and disinfection.—Comparisons are made in Table 5, of the average numbers of cases and deaths in outbreaks of whooping-cough where the measures of isolation and disinfection prescribed by the Michigan State Board of Health, were enforced, with the average numbers of cases and deaths in outbreaks where these measures were neglected.[*]

By this table (5) it may be seen that during the year 1900 there were reported to the office of the State Board of Health, 283[†] outbreaks of whooping-cough, with 3,127 cases, including 140 deaths. Had no efforts at restriction been made, and had the average number of cases and deaths per outbreak remained the same as in the column headed "Isolation and disinfection both neglected," there would have occurred 5,555 cases, including 156 deaths. Had the average numbers of cases and deaths in all outbreaks been the same as those in the column headed "Isolation and disinfection both enforced," there would have occurred only 637 cases, including 48 deaths, or 2,490 cases of sickness, including 92 deaths, from whooping-cough would have been prevented.

Period of incubation in whooping-cough.—The average period of incubation in the twenty-five reported instances is twelve days; the greatest number of instances given in any single period was in the fourteen-day period.

TABLE 6.—*Exhibiting the reported period of incubation, stated in days, in 25 instances of whooping-cough. Compiled from reports of health officers in Michigan, for the year 1900.*

Incubation period—days	7	8	9	10	12	14	21
Instances in each period	*1	†1	‡5	§7	¶1	‖8	**2

* In this instance, reported as about 7 days. † In this instance, reported as about 8 days. ‡ In 3 of these instances, reported as about 9 days. § In 3 of these instances, reported as about 10 days. ¶ In 1 of these instances, reported as about 12 days. ‖ In 3 of these instances, reported as about 14 days. ** In 1 of these instances, reported as about 21 days.

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[*] In the compilation of the reports for Table 5 showing the results obtained by isolation and disinfection, every effort has been made to place the numbers of cases and deaths in each outbreak in the proper columns. If, for instance, there were only one or two cases in an outbreak and the health officer neglected to isolate or disinfect, but for some reason the disease spread no further, the number of cases and deaths were placed in the column headed, "Isolation and disinfection both neglected." If, on the other hand, as often occurs, quite a number of persons are exposed at the same time and place outside the health officer's jurisdiction, and by proper isolation and disinfection he succeeds in confining the disease to the original cases exposed, they are placed in the column headed, "Isolation and disinfection enforced." If, however, he neglects to properly isolate or disinfect, the whole number of these cases and deaths are placed in the "neglected" column. It is to be regretted that many of the reports received at this office do not state exactly what was done to restrict the disease, or are not sufficiently definite to enable the compilers to decide just what was done, and they are obliged to place all such in the column headed, "Isolation or disinfection or both not mentioned; or statements doubtful."

[†] Whenever a break of sixty days or more has occurred in the progress of a communicable disease in a given township, village or city it has been regarded as two different outbreaks, but if the second appearance of the disease could be traced from the first the intermission was disregarded and it was treated as a single outbreak. Also, comparisons of *years* require that outbreaks be counted as closed at the end of the *year;* while in comparing *outbreaks* for testing the value of isolation and disinfection it is necessary to take *complete outbreaks,* even where they extend from one year into the next. This explains the apparent discrepancy between the number of outbreaks here given and the number given at the beginning of this article.

year is common and expected. When a thorough knowledge of this disease becomes general, better and more satisfactory reports may be expected.

TABLE 1.—*Cerebro-spinal meningitis, cerebral meningitis, meningitis, spinal meningitis, and tubercular meningitis in Michigan. The number of reported localities, cases and deaths, the average number of cases and deaths per locality, and the per cent of cases which proved fatal, in 1900; also the total number of cases and of deaths from meningitis other than those reported as tubercular meningitis.*

Year 1900.	Reported localities.	Reported cases.	Average cases per locality.	Reported deaths.	Average deaths per locality.	Deaths per 100 cases reported.
Cerebro-spinal meningitis.....	165	288	1.75	257	1.56	89.24
Cerebral meningitis............	35	65	1.86	61	1.74	93.85
Meningitis......................	127	218	1.72	215	1.69	98.62
Spinal meningitis..............	63	83	1.32	72	1.14	86.75
Tubercular meningitis.........	61	93	1.52	83	1.36	89.25
Total meningitis............	451	747	1.66	688	1.53	92.10
Total meningitis other than tubercular.................	390	654	1.67	605	1.55	92.51

TABLE 2.—*Exhibiting the reported number of deaths from meningitis and from tubercular meningitis per 10,000* persons living in Michigan in each of the thirty years 1869-1900. Compiled from the Secretary of State's Vital Statistics of Michigan. (Population for intercensal years estimated by average annual increase based on national and State censuses.)*

Year.	1869	1870	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881	1882	1883	1884
Meningitis......................	.11	.09	.20	2.82	6.15	1.36	1.18	.84	.92	.71	.65	.97	1.97	1.31	1.29	1.31
Tubercular meningitis..........	.10	.55	.53	.66	.61	.43	.43	.47	.40	.36	.27	.26	.38	.28	.27	.27
Year.	1885	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900
Meningitis †....................	.93	.95	.94	.97	.80	.86	.95	.68	.78	.81	.78	.83	.96	2.81	4.27	2.12
Tubercular meningitis..........	.18	.21	.32	.23	.21	.20	.13	.15	.17	.18	.13	.14	.17	.50	.59	.56

* In the Annual Report for 1900, the figures given for 1899, in Table 2, the basis of population should read per 10,000 instead of per 100,000 population.

† The title meningitis includes spinal meningitis, cerebro-spinal meningitis, spotted fever, etc.; but not that reported as tubercular.

The vital statistics collected and compiled in the Secretary of State's Department, under the new registration law which went into operation in the latter part of 1897, probably represent nearly all deaths which have occurred in the State since that year; whereas the number of reported deaths in the years prior to 1897 should probably be largely increased to equal the actual number of deaths which occurred in those years; therefore, without due allowance for this fact, the statistics for years preceding, are not comparable with those succeeding 1897.

From Table 2 it would appear that during the years specified therein, there occurred two epidemic periods, in which there was a marked increase in the mortality from this disease. The first began in 1872 and reached its maximum intensity in 1873; the other began in 1898 and reached its intensity in 1899. This latter epidemic was not nearly so severe as the former, for whereas the death-rate in the former epidemic was 6.15 per 10,000 of population (compiled from reports made under the old registration law), the highest death-rate in the latter epidemic reached only 4.27 per 10,000 of population (compiled from reports made under the new registration law).

TABLE 3.—*Exhibiting for the years 1899 and 1900, a comparison of all forms of meningitis in the number of reported localities, cases and deaths, the average number of cases and deaths per locality; and per cent of reported cases which proved fatal in each of the years.*

Year.	Reported localities.	Reported cases.	Average cases per locality.	Reported deaths.	Average deaths per locality.	Deaths per 100 cases reported.
1899	544	1,306	2.40	1,079	1.98	82.62
1900	451	747	1.66	688	1.53	92.10

The above table shows a marked decrease in the prevalence of meningitis in 1900, the number of cases including deaths reported in 1899, being nearly twice as many as those reported for the year 1900, indicating that the epidemic evidently reached its maximum in 1899 and is now on the decline.

Good authorities state that, with reference to measures for its restriction, epidemic cerebro-spinal meningitis should be placed in the same category as phthisis pulmonalis, and effective effort should be exercised in the restriction and prevention of this disease as in other dangerous communicable diseases. It is, therefore, desirable to have all cases occurring in the State reported in detail to the Secretary of the State Board of Health, that the compilation of statistics relating to this disease may be more complete and useful.

TABLE 4.—*Numbers of cases and deaths reported from cerebro-spinal meningitis, cerebral meningitis, meningitis, spinal meningitis, tubercular meningitis, and the total cases and deaths from meningitis per 10,000 persons living in the State and in each county in Michigan during the year 1900. (Compiled from the reports of health officers. Includes, also, deaths reported to the State Department. In many other instances only the fatal cases were reported.)*

Counties.	Population of Michigan, 1900, by census.	Cerebro-spinal meningitis.				Cerebral meningitis.				Meningitis.				Spinal meningitis.				Tubercular meningitis.				Total meningitis.			
		Number of reported		Number per 10,000 population of		Number of reported		Number per 10,000 population of		Number of reported		Number per 10,000 population of		Number of reported		Number per 10,000 population of		Number of reported		Number per 10,000 population of		Number of reported		Number per 10,000 population of	
		Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
State	2,420,982	288	257	1.19	1.06	65	61	.27	.25	218	215	.90	.89	83	72	.34	.30	93	83	.38	.34	747	688	3.09	2.84
Alcona	5,691	....	....	....	....	....	....	....	....	1	1	1.76	1.76	....	....	....	....	....	....	....	....	1	1	1.76	1.76
Alger	5,868	2	2	3.41	3.41	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	2	3.41	3.41
Allegan	38,812	4	4	1.03	1.03	....	....	....	....	1	1	.26	.26	....	....	....	....	4	4	1.03	1.03	9	9	2.32	2.32
Alpena	18,254	3	3	1.64	1.64	....	....	....	....	2	2	1.10	1.10	2	1	1.10	.54	....	....	....	....	7	6	3.83	3.29
Antrim	16,568	6	6	3.62	3.62	....	....	....	....	1	1	.60	.60	2	2	1.21	1.21	....	....	....	....	9	9	5.43	5.43
Arenac	9,821	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Baraga	4,320	1	1	2.31	2.31	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1	2.31	2.31
Barry	22,514	2	2	.89	.89	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	2	.89	.89
Bay	62,378	11	10	1.76	1.60	....	....	....	....	5	5	.80	.80	3	3	.48	.48	4	4	.64	.64	23	22	3.69	3.53
Benzie	9,685	....	....	....	....	....	....	....	....	1	1	1.03	1.03	1	1	1.03	1.03	1	1	1.03	1.03	3	3	3.10	3.10
Berrien	49,165	6	5	1.22	1.02	....	....	....	....	1	1	.20	.20	1	1	.20	.20	1	1	.20	.20	9	8	1.83	1.63
Branch	27,811	2	2	.72	.72	....	....	....	....	....	....	....	....	1	1	.36	.36	1	1	.36	.36	4	4	1.44	1.44
Calhoun	49,315	1	1	.20	.20	....	....	....	....	1	1	.20	.20	1	1	.20	.20	1	1	.20	.20	4	4	.81	.81
Cass	20,876	1	1	.48	.48	....	....	....	....	2	1	.96	.48	1	1	.48	.48	....	....	....	....	4	3	1.92	1.44
Charlevoix	13,956	2	1	1.43	.72	1	1	.72	.72	1	1	.72	.72	2	2	1.43	1.43	....	....	....	....	6	5	4.30	3.58
Cheboygan	15,516	9	8	5.80	5.15	....	....	....	....	3	3	1.93	1.93	....	....	....	....	....	....	....	....	12	11	7.73	7.09
Chippewa	21,338	3	3	1.40	1.40	....	....	....	....	2	2	.94	.94	....	....	....	....	....	....	....	....	5	5	2.34	2.34
Clare	8,360	....	....	....	....	....	....	....	....	....	....	....	....	1	1	1.20	1.20	1	1	1.20	1.20	2	2	2.39	2.39
Clinton	25,136	1	1	.40	.40	1	1	.40	.40	4	4	1.59	1.59	1	1	.40	.40	....	....	....	....	7	7	2.78	2.78
Crawford	2,943	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Delta	23,881	8	7	3.35	2.93	....	....	....	....	1	1	.42	.42	....	....	....	....	....	....	....	....	9	8	3.77	3.35
Dickinson	17,890	1	1	.56	.56	....	....	....	....	2	2	1.12	1.12	3	3	1.68	1.68	4	4	2.24	2.24	10	10	5.59	5.59
Eaton	31,668	1	1	.32	.32	....	....	....	....	2	2	.63	.63	....	....	....	....	....	....	....	....	3	3	.95	.95
Emmet	15,931	6	4	3.77	2.51	....	....	....	....	....	....	....	....	1	0	.63	0	....	....	....	....	7	4	4.39	2.51
Genesee	41,804	7	7	1.67	1.67	1	0	.24	0	4	3	.96	.72	1	1	.24	.24	....	....	....	....	13	11	3.11	2.63
Gladwin	6,564	2	2	3.04	3.04	....	....	....	....	....	....	....	....	2	0	3.05	0	....	....	....	....	4	2	6.09	3.05
Gogebic	16,738	2	1	1.19	.60	....	....	....	....	2	2	1.19	1.19	....	....	....	....	....	....	....	....	4	3	2.39	1.79

Grand Traverse	20,479	1		.49	.49	...		...	...	2	2	.98	.98	...		...	...	1	1	.49	.49	4	4	1.95	1.95
Gratiot	29,889	2	2	.67	.67	...		...	...	1	1	.33	.33		1	.33	.33	...	...	...	...	4	4	1.34	1.34
Hillsdale	29,865	1		.33	.33	2	2	.67	.67		1	.33	.33			.33	.33	...	...	...	...	5	5	1.67	1.67
Houghton	66,063	16	13	2.42	1.97	2	2	.30	.30	9	8	1.36	1.21	2	1	.30	.15	12	12	1.82	1.82	41	36	6.21	5.45
Huron	34,162	1	1	.29	.29	1	1	.29	.29	5	5	1.46	1.46	3	3	.88	.88	...	...	...	...	10	10	2.92	2.92
Ingham	39,818	7	6	1.75	1.51	4	4	1.00	1.00	4	4	1.00	1.00	5	5	1.26	1.26	1	1	.25	.25	21	20	5.27	5.02
Ionia	34,329	5	4	1.46	1.17	...		...	...	5	5	1.46	1.46	...		...	...	3	2	.87	.58	13	11	3.78	3.21
Iosco	10,246	...		...	...	...		...	...		...	...	...		0	.98	0	1	0	.98	0	2	0	1.95	0
Iron	8,990	1		1.11	1.11	...		...	...		...	...	...	...		...	...	1	0	1.11	0	2	1	2.22	1.11
Isabella	22,784	2	2	.88	.88	...		...	...	2	2	.88	.88		1	.44	.44	2	0	.88	0	7	5	3.07	2.19
Jackson	48,222	6	5	1.24	1.04	...		...	...	3	3	.62	.62	...		...	...	1	0	.21	0	10	8	2.07	1.66
Kalamazoo	44,310	3	3	.68	.68	1	0	.23	0	4	4	.90	.90	2	2	.45	.45	1	1	.23	.23	11	10	2.48	2.25
Kalkaska	7,133	1		1.40	1.40	...		...			...	...	...	1	1	1.40	1.40	...	...	...	...	2	2	2.80	2.80
Kent	129,714	18	15	1.38	1.15	4	4	.31	.31	12	12	.93	.93	5	5	.39	.39	5	2	.39	.15	44	38	3.40	2.93
Keweenaw	3,217	3	1	9.33	3.11	...		...			...	...	...	...		...	...	1	0	3.11	0	4	1	12.43	3.11
Lake	4,957	...		...	...	...		...			...	...	...	...		...	...	...	...	...	...	...	...	...	...
Lapeer	27,641	...		...	...	...		...		2	2	.72	.72	...		...	...	1	1	.36	.36	3	3	1.09	1.09
Leelanau	10,556	2	2	1.89	1.89	...		...			...	...	...	...		...	...	...	...	...	...	2	2	1.89	1.89
Lenawee	48,406	3	3	.62	.62	4	4	.83	.83	5	5	1.03	1.03	1		.21	.21	2	2	.41	.41	15	15	3.10	3.10
Livingston	19,664	...		...	...	1	1	.51	.51	1		.51	.51	...		...	...	...	...	...	...	2	2	1.02	1.02
Luce	2,983	...		...	...	...		...			...	...	...	...		...	...	...	...	...	...	...	...	...	...
Mackinac	7,703	1		1.30	1.30	1	1	1.30	1.30	1		1.30	1.30	1	1	1.30	1.30	...	...	...	...	4	4	5.19	5.19
Macomb	33,244	5	5	1.50	1.50	...		...		5	5	1.50	1.50	...		...	...	...	...	...	...	10	10	3.01	3.01
Manistee	27,856	1	1	.36	.36	1	1	.36	.36		...	...	...	...		...	...	...	...	...	...	2	2	.72	.72
Marquette	41,239	6	6	1.45	1.45	2	2	.48	.48	4	4	.97	.97	...		...	...	6	6	1.45	1.45	18	18	4.36	4.36
Mason	18,885	1		.53	.53	...		...		3	3	1.59	1.59	...		...		1	1	.53	.53	5	5	2.64	2.64
Mecosta	20,639	3	3	1.45	1.45	...		...		2	2	.97	.97	2	2	.97	.97	...	...	...	...	7	7	3.39	3.39
Menominee	27,046	7	7	2.59	2.59	...		...		1	1	.37	.37	1		.37	.37	...	...	...	...	9	9	3.33	3.33
Midland	14,439	1		.69	.69	1		.69	.69	2	2	1.39	1.39	...		...		...	...	...	...	4	4	2.77	2.77
Missaukee	9,308	1		1.07	.07	...		...				1.07	1.07	2	2	2.15	2.15	...	...	...	...	4	4	4.30	4.30
Monroe	32,754	2		.61	.61	2		.61	.31	2	2	.61	.61			.31	.31	2	2	.61	.61	9	8	2.75	2.44
Montcalm	32,754	6	6	1.83	.83	...		...		2	2	.61	.61	2	2	.61	.61	...	...	...	...	10	10	3.05	3.05
Montmorency	3,234	...		...		...		...			...		...	...		...		...	...	...	...	...	...	...	...
Muskegon	37,036	3	3	.81	.81	...		...		3	3	.81	.81	...		...		3	3	.81	.81	9	9	2.43	2.43
Newaygo	17,673	2	2	1.13	13	...		...		1	1	.57	.57	1		.57	.57	...	...	...	...	4	4	2.26	2.26
Oakland	44,792	3	2	.67	.45	2	2	.45	.45	2	2	.45	.45	...		...		...	...	...	...	7	6	1.56	1.34
Oceana	16,644	3	3	1.80	1.80	...		...		...			...	1		.60	.60	1	1	.60	.60	5	5	3.00	3.00
Ogemaw	7,765	...		...		...		...		...			...	...		...		...	...	...	...	...	...	...	...
Ontonagon	6,197	1	0	1.61	0	1	0	1.61	0	...			...	...		...		...	...	...	...	2	0	3.22	0
Osceola	17,859	...		...		...		...		1		.56	.56	1		.56	.56	...	...	...	...	2	2	1.12	1.12
Oscoda	1,468	...		...		...		...		...			...	...		...		...	...	...	...	...	...	...	...
Otsego	6,175	1	1	1.62	.62	...		...		4	4	6.48	6.48	...		...		...	...	...	...	5	5	8.10	8.10
Ottawa	39,667	6	6	1.51	1.51	3	3	.76	76	4	4	1.01	1.01	...		...		...	...	...	...	13	13	3.28	3.28
Presque Isle	8,821	2	1	2.27	1.13	...		...		...			...	...		...		...	...	...	...	2	1	2.27	1.13
Roscommon	1,787	...		...		...		...		...			...	...		...		...	...	...	...	...	...	...	...
Saginaw	81,222	9	8	1.11	.98	3	3	.37	.37	8		.98	.98	1		.12	12	3	3	.37	.37	24	23	2.95	2.83

TABLE 4.—CONCLUDED.

Counties.	Population of Michigan, 1900, by census.	Cerebro-spinal meningitis.				Cerebral meningitis.				Meningitis.				Spinal meningitis.				Tubercular meningitis.				Total meningitis.			
		Number of reported		Number per 10,000 population of		Number of reported		Number per 10,000 population of		Number of reported		Number per 10,000 population of		Number of reported		Number per 10,000 population of		Number of reported		Number per 10,000 population of		Number of reported		Number per 10,000 population of	
		Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Sanilac	35,055	5	4	1.43	1.14	....	....	......	......	1	1	.29	.29	....	....	......	......	2	2	.57	.57	8	7	2.28	2.00
Schoolcraft	7,889	2	2	2.54	2.54	....	....	......	......	1	1	1.27	1.27	....	....	......	......	1	1	1.27	1.27	4	4	5.07	5.07
Shiawassee	33,866	2	2	.59	.59	1	1	.30	.30	3	3	.89	.89	2	2	.59	.59	2	2	.59	.59	10	10	2.95	2.95
St. Clair	55,228	6	5	1.08	.91	1	1	.18	.18	1	1	.18	.18	4	3	.72	.54	4	4	.72	.72	16	14	2.90	2.53
St. Joseph	23,889	3	3	1.25	1.25	2	2	.84	.84	....	....	......	......	....	....	......	......	....	....	......	......	5	5	2.09	2.09
Tuscola	35,890	3	3	.84	.84	1	1	.28	.28	5	5	1.39	1.39	1	1	.28	.28	1	1	.28	.28	11	11	3.07	3.07
Van Buren	33,274	3	3	.90	.90	....	....	......	......	4	4	1.20	1.20	1	0	.30	0	1	1	.30	.30	9	8	2.70	2.40
Washtenaw	47,761	5	3	1.05	.63	2	2	.42	.42	5	5	1.05	1.05	....	....	......	......	1	1	.21	.21	13	11	2.72	2.30
Wayne	348,793	36	34	1.03	.97	20	20	.57	.57	58	58	1.66	1.66	13	13	.37	.37	16	16	.46	.46	143	141	4.10	4.04
Wexford	16,845	6	4	3.56	2.37	....	....	......	......	2	2	1.19	1.19	3	0	1.78	0	....	....	......	......	11	6	6.53	3.56

Routes by which meningitis enters the body.—Just how meningitis has been spread, has not been plain. The secretary of this Board has heretofore pointed out the fact that the mortality statistics of the State Department for the 10 years, 1887-96 (in which period no epidemic year for meningitis is included), show that, in Michigan, meningitis of all forms, except tubercular meningitis, culminates in August, *following the hot weather and the abdominal diseases* incident to the hot weather. The same is also true relative to tubercular meningitis, providing the year 1888 is left out, in which year the maximum was reached in May, which was probably due to a cold January and the consequent fact that the deaths from consumption in 1888 were nearly 300 more than the yearly average for the 10 years; in other words, 1888 was an epidemic year for consumption. No epidemic year for meningitis not tubercular is included in the above-mentioned 10 years; but from other statistics it seems to be a general truth that *epidemic* meningitis is most prevalent following the cold weather and the diseases of the lungs and air-passages incident to the cold weather; therefore, the specific causes of *epidemic* meningitis, including epidemic tubercular meningitis, probably enter the body by way of the air-passages; also, it is plain, from the statistics, that all *other* meningitis than epidemic is most prevalent following the warm weather and the consequent bowel diseases, therefore it is apparent that its specific causes most frequently enter the body by way of the alimentary canal.

It is hoped that these facts, already proved by statistics, may make the subject of the causation of meningitis, and of its relations to other diseases, much plainer than heretofore.

It should be understood and remembered that meningitis is caused not only by the bacillus tuberculosis, but by various other specific causes of diseases, which find their way through the blood or lymph channels to the membranes covering the brain and spinal cord, and there cause inflammation.

Distribution of meningitis throughout the State.—Table 4 shows the amount of reported sickness and deaths in each county of the State during the year 1900, from meningitis. The county having the greatest number of reported cases of sickness and of deaths was Wayne, where 143 cases, of which 141 died, were reported to have occurred. The least numbers of reported cases and deaths, where sickness occurred, were in Alcona and Baraga counties, from each of which there was reported one fatal case.

Sickness and death-rates from meningitis.—Table 4 shows by counties the distribution of reported cases of sickness and deaths from this disease; it shows also the deaths per 10,000 population for each county and for the State. From these death-rates a better understanding of the comparative amount of sickness and death from the disease in each county may be obtained.

It is shown in Table 4 that the highest death-rate (8.10) was in Otsego county, and the lowest, in which any death occurred (.81), was in Calhoun county. No death was reported as having occurred in either of the counties of Arenac, Crawford, Lake, Luce, Montmorency, Ogemaw and Roscommon.

TABLE 5.—*Exhibiting by months, in each of the years 1872, 1873, 1898, 1899 and 1900, the number of deaths from meningitis, per 10,000 population in Michigan; also the average temperature for the said years, and for the series of years 1872-1900, at the Agricultural College, Michigan. (The numbers of deaths are from reports of the Division of Vital Statistics, Department of State; the temperature is from records of observations at the Michigan Agricultural College.)*

Year, etc.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1872 * Meningitis	.06	.10	.24	.33	.30	.17	.14	.14	.17	.13	.04	.15
† Temperature	21.6	21.3	24.8	47.4	58.5	71.8	74.9	71.2	62.0	47.4	29.8	15.7
1873 * Meningitis	.50	.99	1.13	.95	.69	.46	.32	.37	.31	.21	.15	.19
† Temperature	15.9	19.1	28.3	43.2	57.0	70.6	70.8	69.5	57.4	44.7	28.5	29.5
1898 * Meningitis	.20	.15	.29	.29	.29	.26	.20	.22	.27	.23	.20	.21
† Temperature	26.2	24.4	37.6	44.4	58.4	69.2	73.0	70.5	63.6	50.4	34.4	26.0
1899 * Meningitis	.26	.41	.61	.86	.59	.32	.29	.26	.22	.17	.20	.14
† Temperature	21.8	16.2	27.3	51.4	59.8	70.2	70.7	76.6	58.6	54.1	40.0	26.5
1900 * Meningitis	.27	.19	.33	.27	.26	.21	.19	.23	.17	.24	.15	.16
† Temperature	26.39	18.83	24.89	44.43	60.01	67.59	70.73	74.05	65.31	57.12	35.94	29.69
Av. temp. 1872-1900	22.76	23.62	31.28	47.44	60.15	70.09	73.71	71.50	63.00	50.54	36.57	28.12

* Includes all forms of meningitis reported.
† Degrees Fahrenheit.

Table 5 supplies data for a limited study of the seasonal prevalence of epidemic meningitis and meningitis in Michigan in 1900, and its relation to temperature in Michigan. The years relative to which the data are used in Table 5, except 1900, are chosen on account of their being epidemic years of the disease. It appears that the season of greatest mortality is during the spring months (March, April and May), and that the rise and fall of the death-rate depends much on seasonal changes and especially on extremes of temperature.

The last line of Table 5 gives, by months, the average temperature at the Agricultural College for a series of years comprising 1872-1900 inclusive; which may serve as a basis for the further study of the data contained in Table 5.

TABLE 6.—*Exhibiting the number of cases of meningitis which began and the number which were present in each month of the year 1900, in Michigan. (Compiled from reports to this office by health officers and physicians.) Also, by months, the average temperature, at stations in Michigan, in 1900.*

Cases.	Jan.	Feb.	Mar.	Apr.	May	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Began	57	39	67	56	43	35	34	46	40	44	21	39
Present	99	91	131	117	90	67	67	84	79	83	50	76
Av. Temp	26.83	19.38	25.11	46.95	58.95	66.93	71.53	74.40	65.70	57.73	36.36	28.37

Table 6 is based on statistics for a single year, 1900.

TABLE 7.—*Exhibiting by sex, in certain age-groups, the reported number of cases (fatal and non-fatal) of sickness from meningitis of each name specified; also the totals for all meningitis, and the per cent the cases in each group were of the total number of reported cases. (Compiled from all reports for the year 1900 which stated the age.)*

Ages in groups of years.	Name of the disease.	Sex.	All known ages.*	No. and per cent of cases in certain age-groups.											
				Under 1 year.	1 to 4.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 and over.
Number of cases.	Cerebro-spinal meningitis.	Males.....	141	33	52	16	3	14	5	4	2	3	2	3	4
		Females..	128	27	35	21	14	13	6	2	2	2	1	2	3
Per cent the cases in each group were of all cases of known ages.		Males.....	100	23	37	11	2	10	4	3	1	2	1	2	3
		Females..	100	21	27	16	11	10	5	2	2	2	1	2	2
Number of cases.	Cerebral meningitis.	Males.....	41	9	14	4	1	3	1	1	0	0	4	0	4
		Females..	23	3	10	1	2	1	2	0	2	0	1	0	1
Per cent the cases in each group were of all cases of known ages.		Males.....	100	22	34	10	2	7	2	2	0	0	10	0	10
		Females..	100	13	43	4	9	4	9	0	9	0	4	0	4
Number of cases.	Spinal meningitis.	Males.....	45	13	18	7	1	2	1	0	1	0	0	0	2
		Females..	30	13	7	4	0	1	0	2	1	0	0	1	1
Per cent the cases in each group were of all cases of known ages.		Males.....	100	29	40	16	2	4	2	0	2	0	0	0	4
		Females..	100	43	23	13	0	3	0	7	3	0	0	3	3
Number of cases.	Meningitis.	Males.....	112	39	31	12	6	4	4	3	4	2	2	2	3
		Females..	104	23	39	8	8	7	4	5	1	1	2	0	6
Per cent the cases in each group were of all cases of known ages.		Males.....	100	35	28	11	5	4	4	3	4	2	2	2	3
		Females..	100	22	38	8	8	7	4	5	1	1	2	0	6
Number of cases.	Tubercular meningitis.	Males.....	48	10	15	13	1	2	3	1	2	0	1	0	0
		Females..	43	6	17	6	3	2	3	0	0	2	2	2	0
Per cent the cases in each group were of all cases of known ages.		Males.....	100	21	31	27	2	4	6	2	4	0	2	0	0
		Females..	100	14	40	14	7	5	7	0	0	5	5	5	0
Number of cases.	Total meningitis.	Males.....	387	104	130	52	12	25	14	9	9	5	9	5	13
		Females..	328	72	108	40	27	24	15	9	6	5	6	5	11
Per cent the cases in each group were of all cases of known ages.		Males.....	100	27	34	13	3	6	4	2	2	1	2	1	3
		Females..	100	22	33	12	8	7	5	3	2	2	2	2	3

*** Does not include those cases where the age was not stated.**

TABLE 8.—*Exhibiting by sex, in certain age-groups, the reported number of deaths from meningitis of each name specified; also the totals for all meningitis, and the per cent the deaths in each group were of the total number of reported deaths from meningitis. (Compiled from all reports for the year 1900 which stated the age.)*

Ages in groups of years.	Name of the disease.	Sex.	All known ages.*	No. and per cent of deaths in certain age-groups.											
				Under 1 year.	1 to 4.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 and over.
Number of deaths.	Cerebro-spinal meningitis.	Males.....	137	33	50	16	3	14	4	4	2	2	2	3	4
		Females..	116	25	33	20	12	11	5	2	1	1	1	2	3
Per cent the deaths in each group were of all deaths of known ages.		Males.....	100	24	36	12	2	10	3	3	1	1	1	2	3
		Females..	100	22	28	17	10	9	4	2	1	1	1	2	3
Number of deaths.	Cerebral meningitis.	Males.....	40	9	14	3	1	3	1	1	0	0	4	0	4
		Females..	22	3	9	1	2	1	2	0	2	0	1	0	1
Per cent the deaths in each group were of all deaths of known ages.		Males.....	100	23	35	8	3	8	3	3	0	0	10	0	10
		Females..	100	14	41	5	9	5	9	0	9	0	5	0	5
Number of deaths.	Spinal meningitis.	Males.....	44	13	18	6	1	2	1	0	1	0	0	0	2
		Females..	27	12	5	4	0	1	0	2	1	0	0	1	1
Per cent the deaths in each group were of all deaths of known ages.		Males.....	100	30	41	14	2	5	2	0	2	0	0	0	5
		Females..	100	44	19	15	0	4	0	7	4	0	0	4	4
Number of deaths.	Meningitis.	Males.....	112	39	31	12	6	4	4	3	4	2	2	2	3
		Females..	103	23	38	8	8	7	4	5	1	1	2	0	6
Per cent the deaths in each group were of all deaths of known ages.		Males.....	100	35	28	11	5	4	4	3	4	2	2	2	3
		Females..	100	22	37	8	8	7	4	5	1	1	2	0	6
Number of deaths.	Tubercular meningitis.	Males.....	48	10	15	13	1	2	3	1	2	0	1	0	0
		Females..	43	6	17	6	3	2	3	0	0	2	2	2	0
Per cent the deaths in each group were of all deaths of known ages.		Males.....	100	21	31	27	2	4	6	2	4	0	2	0	0
		Females..	100	14	40	14	7	5	7	0	0	5	5	5	0
Number of deaths.	Total meningitis.	Males.....	381	104	128	50	12	25	13	9	9	4	9	5	13
		Females..	311	69	102	39	25	22	14	9	5	4	6	5	11
Per cent the deaths in each group were of all deaths of known ages.		Males.....	100	27	34	13	3	7	3	2	2	1	2	1	3
		Females..	100	22	33	12	8	7	5	3	2	1	2	2	4

*** Does not include those deaths where the age was not stated.**

TABLE 9.—*Exhibiting, by sex, in days and periods of days, the duration of sickness in fatal and non-fatal cases of variously named meningitis in Michigan, in 1899; showing the per cent of all cases of which the duration was reported, which terminated each day and in each period of days, of sickness.*

	Sex.	No. of cases included.	Duration of sickness.—Total cases.																						
			Per cent terminated in each day of sickness.															Per cent terminated in each period of days of sickness.							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16 to 20	21 to 25	26 to 29	30 to 35	36 to 40	41 to 45	46 to 50	51 and over
Cerebro-spinal meningitis......	Males......	97	13	8	8	8	7	7	7	7	5	1	4	4	3	3	1	6	1	2	0	1	0	0	1
	Females...	99	10	9	10	11	5	6	7	4	4	1	8	1	3	2	3	3	1	3	0	0	2	2	4
Cerebral meningitis.............	Males......	27	15	4	7	7	15	4	4	7	0	4	0	0	0	7	4	7	7	4	0	0	0	0	4
	Females...	20	5	5	10	0	10	0	10	5	0	0	5	0	0	15	5	15	0	0	0	0	5	0	5
Meningitis......................	Males......	70	13	11	7	6	10	4	1	6	3	6	3	4	1	6	1	1	6	3	0	0	0	0	7
	Females...	66	11	14	5	6	5	3	11	5	2	5	6	5	2	3	5	5	5	2	2	2	0	0	3
Spinal meningitis...............	Males......	29	10	14	3	7	7	7	7	7	3	0	3	0	0	7	3	3	3	3	3	3	0	0	3
	Females...	15	13	27	7	7	0	0	13	0	0	0	0	7	0	0	0	13	0	0	0	0	0	0	13
Tubercular meningitis...........	Males......	33	6	0	3	0	0	3	0	0	3	9	6	3	3	9	3	18	12	9	0	0	3	0	9
	Females...	20	5	0	5	5	5	0	20	0	5	0	0	0	0	10	0	5	10	10	0	0	0	5	15
Total...........................	Males......	256	12	8	7	6	8	6	4	6	4	4	4	3	2	6	2	6	5	4	4	1	4	0	4
	Females...	220	10	11	8	8	5	4	10	4	3	2	6	2	2	4	3	6	3	3	1	1	1	1	6
			Duration of sickness.—Non-fatal cases.																						
Cerebro-spinal meningitis......	Males......	6	....	....	....	....	....	....	....	17	17	....	....	....	....	....	....	17	....	17	17	....	......	......	17
	Females...	14	....	....	....	....	....	....	7	....	....	7	14	....	....	....	14	....	....	14	....	....	14	14	14
Cerebral meningitis....	Males......	1	....	....	....	....	....	....	....	100	....	....	....	....	....	....	....	....	....	....	....	....	......	......	......
	Females...	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	100	....	......	......	......
Meningitis......................	Males.....	1	....	....	....	....	....	....	....	....	....	....	....	100	....	....	....	....	....	....	....	....	......	......	......
	Females...	0	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	......	......	......
Spinal meningitis...............	Males......	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	......	......	100
	Females...	2	....	....	....	50	....	....	....	....	....	....	....	....	....	....	....	50	....	....	....	....	......	......	......
Total..................	Males......	9	....	....	....	....	....	....	....	22	11	....	....	11	....	....	....	11	....	11	11	....	......	......	22
	Females...	17	....	....	....	6	....	....	6	....	....	6	12	....	....	....	12	6	....	12	6	....	12	12	12

CAUSE, OR SOURCE OF CONTAGIUM OF MENINGITIS.

TABLE 10.—*Exhibiting, for each of the differently named sorts of meningitis, in Michigan, in 1900, the reported cause, origin, or source of contagium.*

Alleged source, origin, or cause.	Cerebro-spinal meningitis.	Cerebral meningitis.	Meningitis.	Tubercular meningitis.	Spinal meningitis.	Total of all meningitis.
Traced to former case	4	0	0	3	1	8
Unsanitary conditions	5	0	0	0	1	6
Unknown	72	11	41	23	20	167
Not stated	138	38	129	54	49	408
Result of a cold	8	2	4	0	2	16
Result of la grippe	4	0	1	0	0	5
Influenza	2	1	2	0	0	5
Cholera infantum	3	0	1	0	2	6
Scarlet fever	3	0	3	0	0	6
Pneumonia	3	0	1	0	0	4
Dysentery	1	0	1	0	0	2
Whooping cough	1	0	2	0	0	3
Bowel and stomach trouble	4	0	0	0	1	5
Worms, indigestion	1	0	0	0	0	1
Rheumatism	1	0	0	0	0	1
Excessive drinking	1	2	0	0	0	3
Result of fall	1	0	0	1	1	3
Trumatism	1	1	0	0	0	2
Followed otitis media	0	1	0	0	0	1
Abscess in middle ear	1	1	0	0	0	2
Inflammation of eye	1	0	0	0	0	1
Tuberculosis	2	0	1	5	1	9
Malarial poisoning	1	0	0	0	0	1
Sporadic	4	0	1	0	1	6
Measles	3	2	3	1	0	9
Septic poisoning	0	1	0	0	0	1
Overwork	1	0	2	0	0	3
Due to rachitis	0	1	0	0	0	1
Epileptic	1	0	1	0	0	2
Exposure to sun	1	0	0	0	0	1
Inhalation of sewer gas	1	0	0	0	0	1
Result of injury	1	1	8	0	2	12
Bronchitis	1	0	0	0	0	1
Concussion	0	1	0	0	0	1
Puerperal infection	0	1	0	0	0	1
Exposure	2	0	2	0	1	5
Can't trace	5	0	0	0	0	5
Abscess	1	0	0	1	0	2
Spine affected	2	0	0	0	0	2
Weakness from birth	3	0	1	1	0	5
Epidemic	2	0	0	0	0	2
Teething	1	0	2	0	0	3
Hereditary	1	0	0	0	0	1
Cerebral abscess	0	1	0	0	0	1
Peritonitis	0	0	1	0	0	1
Intestinal catarrh	0	0	1	0	0	1
Indigestion	0	0	1	0	1	2
Eating fruit	0	0	1	0	0	1
Abortion	0	0	1	0	0	1
Pleurisy	0	0	0	1	0	1
Enlarged glands	0	0	0	1	0	1
Cigarette smoking	0	0	0	1	0	1
Tumor	0	0	1	0	0	1
Typhoid fever	0	0	3	0	0	3
Enteritis	0	0	2	0	0	2
Dropsy of brain	0	0	0	1	0	1
Female trouble	0	0	1	0	0	1
Total	288	65	218	93	83	747

From Table 7 it would appear that meningitis is largely a children's disease, a large proportion of those affected being children under ten years of age. Of the 715 persons of known ages, included in Table 7, 176 (25 per cent) were infants under one year old; 414 (58 per cent) were under five years; 506 (71 per cent) were of ages under ten years.

Table 8 shows that of the 692 persons who died of the variously named forms of meningitis in Michigan in 1900, 173 (25 per cent) were under one year old; 403 (58 per cent) were under five years of age; 492 (71 per cent) had not attained the age of ten years.

The average age of all decedents from meningitis of whom the ages were reported, was, for males 9.4, and for females 10 years.

The average age of the persons who died was as follows: Cerebro-spinal meningitis, males 9.3, females 9.2 years; spinal meningitis, males 6.3, females 9.0 years; meningitis, males 9.3, females 10.7 years; tubercular meningitis, males 7.8, females 10.3 years.

Cause, or source of contagium of meningitis.—In Table 10 the statements "unknown", "can't trace", and "not reported" illustrate, in a measure, the difficulty of obtaining any definite, useful information relative to the source of the contagium of the disease and its mode of transmission from person to person. Of the 747 cases of the disease reported to have occurred in the State in 1900, the source of contagium of 574 was reported as "unknown" or were "not reported". Of the remaining 172 cases, only eight were traced to a former case of the disease. Five were attributed to exposure, twelve to injury, five to la grippe, sixteen as a result of cold. The remaining one hundred and thirty-six to a large number of other causes the study of which, however, is instructive, especially those like "followed pneumonia", "bronchitis", "followed otitis media", etc.

SMALLPOX (VARIOLA) IN MICHIGAN IN 1900.

During the year ending December 31, 1900, there were reported to the Secretary of the State Board of Health, one hundred outbreaks of smallpox in ninety-five localities in Michigan, which resulted in 694 cases, including nine deaths. For the same year there were reported to the Secretary of State the same number of deaths from smallpox, as were reported to this office.

Success of efforts for the restriction of smallpox.—Of the one hundred reported outbreaks of smallpox in Michigan in 1900, fifty-one per cent of those outbreaks were restricted to the one household where the first case occurred.

Smallpox epidemic.—The mild but widespread epidemic of smallpox which has been prevalent in Michigan during the year 1900, is a part of the general widespread epidemic now prevalent in many sections of the United States. A marked characteristic of the disease existing in Michigan as in other States during the year 1900, has been its extreme mildness. This particular feature of the disease has been so marked, that in many instances delay in combating it has resulted, very greatly increasing the difficulty of restricting the spread of the disease. An evidence of the mildness of the disease is shown by the very low fatality in the State. In the year 1900 only nine deaths have been reported to have occurred out of a total of 694 cases of sickness, which gives the exceedingly low fatality of 1.3 deaths per 100 cases.

TABLE, *Exhibiting the estimated population of Michigan in each of the years 1892-1900 inclusive, the number of cases and deaths from smallpox in each year, and the death-rate each year,—deaths per ten thousand inhabitants.*

Year.	Population.	Cases.	Deaths.	Death-rate.
1892	2,185,279	1	1	.004
1893	2,204,563	10	3	.01
1894	* 2,241,454	285	60	.27
1895	2,271,375	185	47	.21
1896	2,301,296	38	16	.07
1897	2,331,217	15	0	.00
1898	2,361,139	32	1	.004
1899	2,391,061	139	6	.02
1900	† 2,420,982	694	9	.04

* State Census.
† U. S. Census.

Notwithstanding the very unusually large number of cases of the disease, the number of deaths in this State in the year 1900 has been less than the average for the eight years, 1892-1899, when the average number of deaths from smallpox was 16.75 per year. In 1900 it has been only .04 of one reported death for every 10,000 persons in the State.

Lumber camps have been the source from which many outbreaks have originated, perfect protection against the disease in lumber districts being difficult, owing to the frequent changing of laborers from one camp into another and into other parts of the State, to the fact that usually no physician is near to recognize the disease, and the health officer is usually at a considerable distance from the camp.

In quite a number of instances it has been found necessary to send State Inspector, Dr. Geo. E. Ranney, to investigate outbreaks of smallpox. The report of the State Inspector has enabled this office to avail itself of the details of the outbreak visited, and has facilitated the work of combating the disease. This method, also, has proved an effective means of lessening the spread of the disease, by educating the people as to the necessity of prompt action, strict isolation of all infected persons and things, immediate and general vaccination, and after death or recovery of patients the thorough disinfection of all infected things.

Distribution of smallpox by counties during 1900.—The distribution by counties is shown in Table 1, as follows:

TABLE 1.—*Numbers of reported cases and deaths from smallpox and the numbers per 10,000 persons living in each county in Michigan (from which smallpox was reported) during the year 1900. (Compiled from reports of health officers, etc.)*

Counties.	Population of Michigan for 1900.	Number of reported		Number per 10,000 population, of	
		Cases.	Deaths.	Cases.	Deaths.
State	2,420,982	694	9	2.87	.04
Alger	5,868	12	0	20.45	0
Allegan	38,812	2	0	.52	0
Arenac	9,821	1	0	1.02	0
Baraga	4,320	32	0	47.07	0
Bay	62,378	6	0	.96	0
Benzie	9,685	3	0	3.10	0
Berrien	49,165	20	0	4.07	0
Calhoun	49,315	1	0	.20	0
Cheboygan	15,516	1	0	.64	0
Chippewa	21,338	1	0	.47	0
Delta	23,881	11	0	4.61	0
Eaton	31,668	4	0	1.26	0
Emmet	15,931	44	1	27.62	.63
Gladwin	6,564	3	0	4.57	0
Gogebic	16,738	34	0	20.31	0
Gd. Traverse	20,479	1	0	.49	0
Houghton	66,063	53	1	8.02	.15
Ingham	39,818	3	0	.75	0
Iosco	10,246	1	0	.98	0
Isabella	22,784	10	0	4.39	0
Jackson	48,222	2	0	.41	0
Kent	129,714	42	2	3.24	.15
Keweenaw	3,217	1	0	3.11	0
Lake	4,957	18	0	36.31	0
Livingston	19,664	1	0	.51	0
Luce	2,983	3	0	10.06	0
Marquette	41,239	87	1	21.10	.24
Mason	18,885	140	1	74.13	.53
Montcalm	32,754	3	0	.92	0
Ontonagon	6,197	4	0	6.45	0
Osceola	17,859	2	0	1.12	0
Ottawa	39,667	6	0	1.51	0
Saginaw	81,222	42	0	5.17	0
Sanilac	35,055	3	0	.86	0
Shiawassee	33,866	14	0	4.13	0
St. Clair	55,228	1	0	.18	0
St. Joseph	23,889	2	0	.84	0
Washtenaw	47,761	4	0	.84	0
Wayne	348,793	76	3	2.18	.09

TABLE 2.—*Exhibiting the reported number of outbreaks of smallpox which began, the number which ended, and the number of outbreaks which were present, in each month of the year 1900, in the different local jurisdictions of Michigan.*

Outbreaks.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Number began......	0	5	6	8	4	4	1	5	3	11	19	30	96
Number ended......	0	1	6	4	4	7	6	3	1	2	7	19	60
Number present....	2	7	12	14	14	14	8	7	7	17	34	57	0

Number of outbreaks of smallpox in each month of the year 1900.— Sometimes the beginning of an outbreak is reported, but the exact time of the close of the outbreak is not reported; and sometimes the month in which the outbreak ended is given without giving the date of the beginning of the outbreak. In either case the outbreak may have begun and ended in the same month, or it may have extended through several months. The last line of figures, in Table 2, representing the reported number of outbreaks present, is not derived from the preceding two lines, as might be supposed, but is obtained by actual count of the number of outbreaks reported as existing in each month.

TABLE 3.—*Exhibiting the number and per cent of localities from which the presence of smallpox was reported, the number and per cent of cases of smallpox present in Michigan in each month and the number and per cent of cases of smallpox taken sick in each month, during the year 1900. (Includes each case for which the time during which it existed was stated in the report. Each of such cases is counted in each month in which, or part of which, the case was reported to have existed.)*

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Infected localities, number	2	7	12	13	14	14	8	7	7	17	34	56
Per cent....................	2.1	7.4	12.6	13.7	14.7	14.7	8.4	7.4	7.4	17.9	35.8	58.9
Cases present, number.....	2	29	41	78	74	68	23	13	21	64	196	278
Per cent....................	.3	4.2	5.9	11.2	10.6	9.8	3.3	1.9	3.0	9.2	28.2	40
Cases taken sick, number..	2	28	24	55	41	37	2	8	13	40	140	165
Per cent....................	.3	4	3.5	7.9	5.9	5.3	.3	1.2	1.9	5.8	20.1	23.7

The total of the first line of figures in Table 3 exceeds the total infected localities (95), for the reason that some of the localities remained infected in more than one month. This results in making the total of the second line of figures, which state the per cent, exceed one hundred.

The second line of figures, in Table 3, shows the per cent the localities infected in each month are of the total number of infected localities (95) reported to this office for the year 1900.

The third line of figures, in Table 3, shows the number of cases reported sick in any part of each month.

As some of the cases were sick longer than one month they are included in the cases sick in more than one month; therefore, the sum of the cases sick in all the months exceeds the total of reported cases (694) in 1900; and the sum of the fourth line of figures in Table 3 exceeds 100.

The fourth and sixth lines of figures, in this table, show the per cent the cases present, and the per cent the cases taken sick, in each month are of the total number of cases (694) *reported* to this office for the year 1900.

TABLE 4.—*Reported source of contagium of cases of smallpox, in 1900.*

Traced to a former case	407
Contagium reported as from outside jurisdiction	43
Contagium reported as probably from outside jurisdiction	6
Unknown or reports not definite	31
Not stated	207
All cases	694

Of the 694 cases of smallpox reported, during the year 1900, as exhibited in Table 4, the local health officers reported the source of contagium as follows: Traced to a former case, 407; from outside jurisdiction, 43; probably from outside jurisdiction, 6; unknown, 31; not stated or indefinitely reported, 207; total, 694.

Table 5 shows that of 98 outbreaks, in 21 of them isolation and disinfection were either not mentioned or the statements were so doubtful as to be impossible of classification; a majority of them were probably neglected; in seven outbreaks disinfection was enforced and isolation was doubtful; in eight outbreaks, isolation was enforced, but disinfection was doubtful; in thirteen outbreaks disinfection was enforced and isolation was neglected; in two outbreaks isolation was enforced and disinfection was neglected; in eighteen outbreaks isolation and disinfection were both neglected, and out of the 98 outbreaks reported, twenty-nine were reported as enforced. The results of the different modes of action are shown in Table 5.

Estimated number of outbreaks and cases of smallpox prevented and lives saved by isolation and disinfection.—Comparisons are made in Table 5, of the average numbers of cases, including deaths, in outbreaks of smallpox where the measures of isolation and disinfection, prescribed by the Michigan State Board of Health, were enforced, with the average numbers of cases, including deaths, in outbreaks where these measures were neglected.*

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* In the compilation of the reports for Table 5 showing the results obtained by isolation and disinfection, every effort has been made to place the numbers of cases and deaths in each outbreak in the proper columns. If, for instance, there were only one or two cases in an outbreak and the health officer neglected to isolate or disinfect, but for some reason the disease spread no further, the number of cases and deaths were placed in the column headed, "Isolation and disinfection both neglected." If, on the other hand, as often occurs, quite a number of persons are exposed at the same time and place outside the health officer's jurisdiction, and by proper isolation and disinfection he succeeds in confining the disease to the original cases exposed, they are placed in the column headed, "Isolation and disinfection enforced." If, however, he neglects to properly isolate or disinfect, the whole number of these cases and deaths are placed in the "neglected" column. It is to be regretted that many of the reports received at this office do not state exactly what was done to restrict the disease, or are not sufficiently definite to enable the compilers to decide just what was done, and they are obliged to place all such in the column headed, "Isolation or disinfection or both not mentioned; or statements doubtful."

TABLE 5.—SMALLPOX IN MICHIGAN IN 1900: *Exhibiting the average numbers of cases and deaths per outbreak:—(1) in all the 98 outbreaks reported; (2) in the 21 outbreaks in which it is doubtful whether or not disinfection or isolation was enforced; (3) in the 7 outbreaks in which disinfection was enforced and isolation doubtful; (4) in the 8 outbreaks in which isolation was enforced and disinfection was doubtful; (5) in the 13 outbreaks in which disinfection was enforced and isolation neglected; (6) in the 2 outbreaks in which isolation was enforced and disinfection neglected; (7) in the 18 outbreaks in which isolation and disinfection were both neglected; (8) in the 29 outbreaks in which isolation and disinfection were both enforced.*

	(1) All outbreaks. (98 outbreaks.)		(2) Isolation or disinfection or both not mentioned, or statements doubtful. (21 outbreaks.)		(3) Disinfection enforced—isolation doubtful. (7 outbreaks.)		(4) Isolation enforced—disinfection doubtful. (8 outbreaks.)		(5) Disinfection enforced—isolation neglected. (13 outbreaks.)		(6) Isolation enforced—disinfection neglected. (2 outbreaks.)		(7) Isolation and disinfection both neglected. (18 outbreaks.)		(8) Isolation and disinfection both enforced. (29 outbreaks.)	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals....	1,002	11	163	2	16	0	12	0	124	1	2	0	576	5	109	3
Averages	10.22	0.11	7.76	0.95	2.3	0	1.5	0	9.5	0.07	1	0	32	.28	3.8	0.1

ISOLATION AND DISINFECTION RESTRICT SMALLPOX.

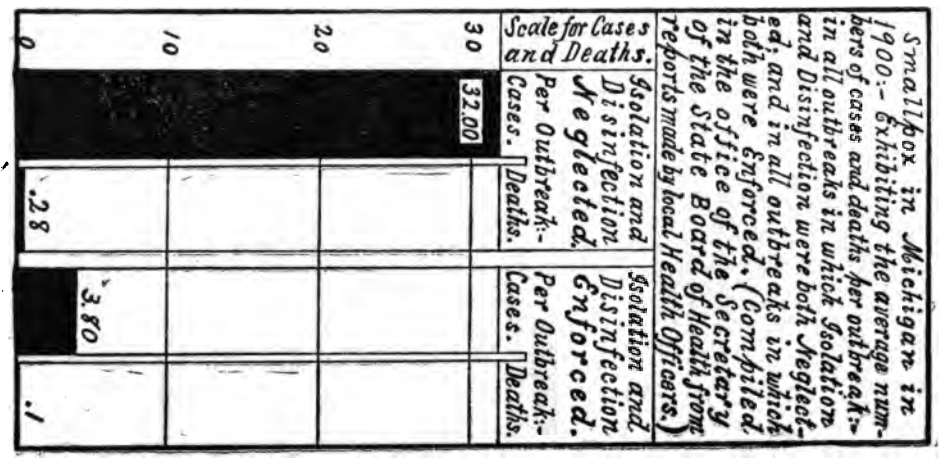

PLATE 1113

The diagram [Plate 1113], on Isolation and Disinfection of Smallpox, exhibits graphically what has been accomplished in those outbreaks of smallpox in Michigan, in the year 1900, where isolation and disinfection has been enforced, compared with those outbreaks where isolation and disinfection has been neglected. An average of thirty-two cases with twenty-eight one-hundredths of one death per outbreak has occurred in those outbreaks where isolation and disinfection has not been practiced, while an average of only three and eight-tenths cases with one-tenth of one death per outbreak has resulted where isolation and disinfection has been enforced.

TABLE 6.—*Exhibiting the reported period of incubation, stated in days, in 40 cases of smallpox. Compiled from reports of health officers in Michigan, for the year 1900.*

Incubation period—days	6	7	8	9	10	11	12	14	16	17	18	21	60
Cases in each period	1	1	*1	2	†4	3	3	‡15	2	1	4	2	1

* In one instance about 8 days.
† In two instances about 10 days.
‡ In seven instances about 14 days.

The average period of incubation of smallpox in the 40 cases is 14.5 days.

TABLE 7.—*Exhibiting in certain age-groups, the number of cases and the number of deaths from smallpox; the per cent that the cases is each group were of all cases of known ages, the per cent that the deaths in each group were of all deaths at known ages; and the per cent that the deaths in each group were of the cases in that group. Compiled from all reports for the year 1900, which stated the ages.*

	Number and per cent of cases and deaths in certain age-groups.																		
Ages in groups of years.	All ages known.	Under 1.	1.	2.	3.	4.	Under 5.	5-9.	10-14.	15-19.	20-24.	25-29.	30-34.	35-39.	40-44.	45-49.	50-54.	55-59.	60 and over.
No. of cases*	434	7	5	8	9	14	43	51	46	52	66	60	28	25	24	16	12	3	7
Per cent the cases in each group were of all cases of known ages	....	1.6	1.2	1.8	2.1	3.2	9.9	11.8	10.6	12	15.2	13.8	6.5	5.8	5.5	3.7	2.8	.7	1.6
No. of deaths*	9	2	0	0	0	0	2	0	0	1	3	1	0	1	0	0	0	1	0
Per cent the deaths in each group were of cases in that group	2.1	28.6	0	0	0	0	4.7	0	0	1.9	4.5	1.7	0	4	0	0	0	33.3	0
Per cent the deaths in each group were of all deaths, at known ages	....	22.2	0	0	0	0	22.2	0	0	11.1	33.3	11.1	0	11.1	0	0	0	11.1	0
Per cent the deaths in special groups were of all deaths, known ages	....	22.2					22.2		66.6						11.1				

* Does not include those cases or deaths where the age was not stated.

By this table (5) it may be seen that during the year 1900 there were reported to the office of the State Board of Health, 98† outbreaks of smallpox, with 1,002 cases, including eleven deaths. Had no efforts at restriction been made, and had the average number of cases and deaths per outbreak remained the same as in the column headed "Isolation and disinfection both neglected," there would have occurred 3,136 cases and twenty-seven deaths. Had the average numbers of cases and deaths in all outbreaks been the same as those in the column headed "Isolation and disinfection both enforced," there would have occurred only 372 cases and ten deaths, or 630 cases of sickness and one death from smallpox would have been prevented.

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† Whenever a break of sixty days or more has occurred in the progress of a communicable disease in a given township, village or city it has been regarded as two different outbreaks, but if the second appearance of the disease could be traced from the first the intermission was disregarded and it was treated as a single outbreak. Also, comparisons of *years* require that outbreaks be counted as closed at the end of the *year;* while in comparing *outbreaks* for testing the value of isolation and disinfection it is necessary to take *complete outbreaks,* even where they extend from one year into the next. This explains the apparent discrepancy between the number of outbreaks here given and the number given at the beginning of this article.

TABLE 8.—*Exhibiting by sex, the number of persons in certain age-groups, who recovered from smallpox, and the per cent of cases by age-groups who recovered from smallpox, in Michigan, in 1900, also the average age and the number of cases included. (Compiled from such reports as stated the ages.)*

Year.	Sex.	Average age of non-fatal cases, years.	No. of cases included.	Age.—In periods of years. Number of (non-fatal) cases in each period of age.										
				All ages.	Under 5 years.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 years and over.
1900.	Males...........	23.8	252	......	19	22	19	29	46	45	21.	17	13	21
	Females........	20.5	172	......	22	29	27	22	17	14	7	7	11	16
	Per cent the non-fatal males in each age-group were of the total non-fatal males..			100	7.5	8.7	7.5	11.5	18.3	17.9	8.3	6.7	5.2	8.3
	Per cent the non-fatal females in each age-group were of the total non-fatal females....................			100	12.8	16.9	15.7	12.8	9.9	8.1	4.1	4.1	6.4	9.3

TABLE 9.—*Exhibiting, by sex of patient, the duration (in days) of non-fatal cases of sickness from smallpox, in Michigan, during the year 1900. Per cent of cases arranged in five-day groups. (Compiled from those reports which stated the length of time the patient was sick.)*

*Non-fatal cases of smallpox.																
Year.	Sex.	No. of cases included.	Duration of sickness:—Per cent of cases in each period of days.													
			All periods.	1 to 5.	6 to 10.	11 to 15.	16 to 20.	21 to 25.	26 to 30.	31 to 35.	36 to 40.	41 to 45.	46 to 50.	51 to 55.	56 to 60.	61 to 65.	66 and over.
1900.	Males....................	253	100	.4	4	11.9	15	28.9	17.8	7.5	5.9	3.6	2.4	.8	.8	.8	1.2
	Females...	174	100	6.3	5.2	17.8	16.1	24.7	13.8	6.3	1.7	2.3	2.3	1.1	.6	0	1.7

* There were but nine fatal cases which stated the duration of sickness.

TABLE 10.—*Exhibiting the localities in Michigan, arranged alphabetically, at which smallpox was reported present during the year 1900, and the cases and deaths occurring in each locality.*

Localities.	Counties.	Cases.	Deaths.	Localities.	Counties.	Cases.	Deaths.
Adams tp	Houghton	1	0	Laird tp	Houghton	1	0
Allendale tp	Ottawa	1	0	Lake Linden	Houghton	1	0
Allouez tp	Keweenaw	1	0	L'Anse	Baraga	3	0
Amber tp	Mason	9	0	Leslie	Ingham	1	0
Ann Arbor	Washtenaw	1	0	Lima tp	Washtenaw	1	0
Arenac tp	Arenac	1	0	Littlefield tp	Emmet	1	0
Arvon tp	Baraga	2	0	Locke tp	Ingham	1	0
Au Sauble tp	Iosco	1	0	Ludington	Mason	4	0
Baldwin	Lake	15	0	Manlius tp	Allegan	1	0
Baraga	Baraga	21	0	Maple River tp	Emmet	37	0
Baraga tp	Baraga	4	0	Marquette	Marquette	39	1
Benton Harbor	Berrien	13	0	Marshall	Calhoun	1	0
Bessemer tp	Gogebic	32	0	Mentor tp	Cheboygan	1	0
Billings tp	Gladwin	3	0	Michigamme tp	Marquette	1	0
Branch tp	Mason	2	0	Munising	Alger	2	0
Brant tp	Saginaw	1	0	Negaunee	Marquette	20	0
Burt tp	Alger	10	0	Newberry	Luce	3	0
Calumet tp	Houghton	2	0	Nottawa tp	Isabella	10	0
Carsonville	Sanilac	2	0	Ontonagon	Ontonagon	3	0
Cato tp	Montcalm	3	0	Pere Marquette tp	Mason	5	0
Center tp	Emmet	2	1	Petoskey	Emmet	1	0
Champion tp	Marquette	1	0	Pleasant Plains tp	Lake	1	0
Charlotte	Eaton	3	0	Potterville	Eaton	1	0
Chocolay tp	Marquette	5	0	Red Jacket	Houghton	1	0
Colon tp	St. Joseph	2	0	Republic tp	Marquette	2	0
Coopersville	Ottawa	5	0	Richmond tp	Osceola	1	0
Custer	Mason	90	1	Saginaw	Saginaw	3	0
Custer tp	Mason	29	0	Salem tp	Washtenaw	2	0
Detroit	Wayne	33	1	Sault Ste. Marie	Chippewa	1	0
Duncan tp	Houghton	1	0	Sherman tp	Mason	1	0
Durand	Shiawassee	14	0	South Frankfort	Benzie	3	0
Elk tp	Lake	1	0	Springwells tp	Wayne	32	2
Escanaba	Delta	1	0	Spurr tp	Baraga	2	0
Essexville	Bay	6	0	St. Charles tp	Saginaw	38	0
Fowlerville	Livingston	1	0	St. Clair	St. Clair	1	0
Franklin tp	Houghton	27	1	Torch Lake tp	Houghton	2	0
Friendship tp	Emmet	3	0	Traverse City	Gd. Traverse	1	0
Gladstone City	Delta	10	0	Turin tp	Marquette	6	0
Grand Rapids	Kent	27	2	Wakefield	Gogebic	1	0
Grand Rapids tp	Kent	15	0	Wakefield tp	Gogebic	1	0
Greenland tp	Ontonagon	1	0	Watertown tp	Sanilac	1	0
Grosse Pointe tp	Wayne	1	0	Watervliet tp	Berrien	7	0
Hancock	Houghton	5	0	Watson tp	Allegan	1	0
Hancock tp	Houghton	3	0	Webber tp	Lake	1	0
Hersey	Osceola	1	0				
Houghton	Houghton	9	0	Wheatfield tp	Ingham	1	0
Huron tp	Wayne	7	0	Wyandotte	Wayne	3	0
Ishpeming	Marquette	13	0	46	10	251	3
Jackson	Jackson	2	0	49	29	443	6
49	29	443	6	95	39	694	9

TABLE 11.—*First, second and third localities, where the second locality was infected with smallpox from the first, and the third was infected from the second; and the number of cases and deaths from smallpox in he first, second and third localities with the dates of the beginning and ending of each outbreak. (Compiled from reports of health officers who were able to trace the source of the contagium to other localities.)*

First localities from which smallpox was spread.			**Second** localities infected from first.			**Third** localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Antrim county: Central Lake village....	*	....	Emmet county: Petoskey city.......... (Dec. 11-Jan. 8, 1901.)	1	0			
Baraga county: Spurr township......... (Nov.-Dec. 12.)	2	0	Marquette county: Republic township .... (Nov. 8-Dec. 22.)	2	0			
Delta county: Maple Ridge township..	*	....	Delta county: Escanaba city.......... (Oct. 12-Nov. 15.)	1	0			
Houghton county: Osceola township.......	*	....	Houghton county: Lake Linden village... (Aug 3-Aug. 30.)	1	0			
Ingham county: Williamston village....	*	....	Ingham county: Locke township........ (Apr. 9-Apr. 19.)	1	0			
Lapeer county: North Branch village...	*	....	Sanilac county: Watertown township.. (Dec. 10-Dec. 24.)	1	0			
Marquette county: Marquette city.......... (Oct. 16-Jan. 31, 1901.)	45	1	Alger county: Munising village ...... (Oct.-Dec. 18.)	2	0	Emmet county: Maple River Tp.†....	37	0
			Delta county: Gladstone city......... (Nov.-Jan. 9, 1901.)	10	0			
			Houghton county: Duncan township...... (Nov. 25-Dec. 19.)	1	0			
			Ottawa county: Allendale township.... (Nov. 11-Dec. 2.)	1	0			
			Wayne county: Detroit city............ (Oct. 25-Dec. 20.)	3	0			
Marquette county: Negaunee city.......... (Nov. 2-Dec. 24.)	20	0	Grand Traverse county: Traverse city........... (Nov. 11-Nov. 30.)	1	0			
			Keweenaw county: Allouez township...... (Dec. 13-Dec. 31.)	1	0			
Saginaw county: Saginaw city............ (Nov. 30-July 9, 1901.)	228	1	Calhoun county: Marshall city........... (May 3-May 30.)	1	0			
Upper Peninsula.........	....	....	Benzie county: So. Frankfort village.. (Dec. 20——.)	3	0			
			Gladwin county: Billings township...... (Dec. 20-Jan. 14, 1901.)	3	0			

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* Smallpox was not reported to this office by the health officer of the "first" locality at the time it was said to have spread from there; showing that the disease, if present, was neglected; probably it was not reported to the health officer as the law requires.

† From Maple River township, Emmet county, smallpox spread to Center township, Emmet county, two cases and one death, and to Littlefield township, Emmet county, one case.

TABLE 11.—CONTINUED.—*Movement of infection of smallpox.*

First localities from which smallpox was spread.			**Second** localities infected from first.			**Third** localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Wayne county: Detroit (Feb. 21-June 9.)	30	1	Ingham county: Wheatfield township (Feb. 21-Mar. 16.)	1	0			
			Iosco county: Au Sable township (July 6-July 24.)	1	0			
			Livingston county: Fowlerville village (Mar. 2-Mar. 26.)	1	0			
			Ottawa county: Coopersville village (Mar. 7-Apr. 9.)	5	0			
			Sanilac county: Carsonville village (Feb. 6-Mar. 5.)	2	0			
			Shiawassee county: Durand village (Mar. 1-July 13.)	14	0			
			St. Clair county: St. Clair city (Feb. 26-Mar. 13.)	1	0			
			St. Joseph county: Colon township (Apr. 1-May 26.)	2	0			
			Washtenaw county: Salem township (Feb. 21-Mar. 25.)	2	0			
Wayne county: Huron township (May-June 30.)	7	0	Wayne county: Wyandotte city (May 15-June.)	3	0			
Movement of infection of smallpox **into Michigan** from outside the State.								
Arkansas	....	....	Kent county: Grand Rapids city (Apr. 1-Apr. 12.)	1	1			
Canada	....	....	Chippewa county: Sault Ste. Marie city (Dec. 20-Jan., 1901.)	1	0			
Canada: Montreal	....	....	Marquette county: Turin township (Nov. 2-Dec. 10.)	6	0			
Colorado: Denver	....	....	Jackson county: Jackson city (June 5-July 5.)	2	0			
			Osceola county: Hersey village (June 30-July 21.)	1	0			
Colorado: Salida	....	....	Allegan county: Watson township (Dec. 15-Jan. 11, 1901.)	1	0			

TABLE 11.—CONTINUED.—*Movement of infection of smallpox* **into Michigan** *from outside the State.*

First localities from which smallpox was spread.			**Second** localities infected from first.			**Third** localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Cuba	....	....	Houghton county: Hancock hospital	....	....	Houghton county: Hancock village (Aug. 25-Oct.) Houghton village† (Aug. 1——.) Torch Lake township (Aug. 23-Oct. 8.)	 5 9 2	 0 0 0
Illinois: Chicago	....	....	Ingham county: Leslie village (Dec. 28-Jan. 30, 1901.)	1	0			
Illinois: Dixon	....	....	Kent county: Grand Rapids township (April 15-June 7.)	15	0	Kent county: Grand Rapids city (Apr.-July 16.)	20	1
Indiana: Elkhart	....	....	Kent county: Grand Rapids city (Mar. 2-Mar. 27.)	1	0			
Kentucky	....	....	Saginaw county: St. Charles township (Mar. 31-June 14.)	38	0	Saginaw county: Brant township (Apr. 20-June 4.)	1	0
Minnesota: Duluth	....	....	Baraga county: Baraga township (Nov. 10-Feb. 28, 1901.)	8	0			
Minnesota: Two Harbors	....	....	Ontonagon county: Ontonagon village (Dec. 10-Jan. 30, 1901.)	3	0	Ontonagon county: Greenland township (Dec. 24-Jan. 22, '01.)	1	0
Ohio: Cleveland	....	....	Kent county: Grand Rapids city (Nov. 14-Aug. 21, 1901.)	40	0			
Ohio: Conneaut	....	....	Bay county: Essexville village (Nov. 28-Jan. 7, 1901.)	6	0	Arenac county: Arenac township (Dec. 25-Jan., 1901.)	1	0
Ohio: Holgate	....	....	Isabella county: Nottawa township (June-Aug. 30.)	10	0			
Ohio	....	....	Washtenaw county: Lima township (Dec. 24-Jan. 29, 1901.)	1	0			
Wisconsin: Ashland	....	....	Gogebic county: Wakefield village (Nov. 2-Dec. 2.)	1	0			
			Mason county: Custer village (Sept. 14-Jan. 2, 1901.)	91	1	Lake county: Baldwin village‡ (Dec. 4-Apr. 16, 1901.) Mason county: Amber township§ (Nov. 20-Dec. 31.) Ludington city (Dec. 4-Feb. 27, 1901.) Sherman township (Dec. 11-Dec. 25.)	 24 9 5 1	 0 0 0 0
			Custer township (Oct. 28-Feb. 28.)	43	0			
			Ludington city (Nov. 20-Dec. 20.)	1	0			

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† From Houghton village, Houghton county, smallpox spread to Michigamme township, Marquette county, one fatal case.

‡ From Baldwin village, Lake county, 24 cases smallpox spread to Elk township, Lake county, one case; spread to Webber township, Lake county, one case, and spread to Branch township, Mason county, two cases.

§ From Amber township, Mason county, nine cases smallpox spread to Pere Marquette township, Mason county, five cases.

TABLE 11.—CONCLUDED.—*Movement of infection of smallpox* **into Michigan** *from outside the State.*

First localities from which smallpox was spread.			**Second** localities infected from first.			**Third** localities infected from second.		
Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Wisconsin: New London	....	....	**Montcalm county:** Cato township (May 9-June 23.)	3	0			
Wisconsin	....	....	**Gogebic county:** Bessemer township (Oct. 18-Jan. 14, 1901.)	32	0			
Probable movement of infection of smallpox.								
Baraga county: Baraga village (Nov. 26-Feb. 25, 1901.)	22	0	Marquette county: Champion township (Dec. 1-Dec. 27.)	1	0			
Emmet county: Petoskey city	1	0	Cheboygan county: Mentor township	1	0			
Houghton county: Hancock village (Aug. 25-Oct.)	5	0	Houghton county: Franklin township (Sept. 29-Nov. 24, 1901.)	27	1			
Luce county: McMillan township	*	....	Luce county: Newberry village (Dec. 20-Apr. 15, 1901.)	22	0			
Probable movement of infection of smallpox **into Michigan** from outside the State.								
Ohio: Cleveland	....	....	Washtenaw county: Ann Arbor city Dec. 17-Jan. 28, 1901.)	1	0			
Newaygo county: Ashland township	*	....	Marquette county: Negaunee city (Nov. 2-Dec. 24.)	20	0			
Wyoming	....	....	Saginaw county: Saginaw city (Nov. 30-July 9, 1901.)	228	1			

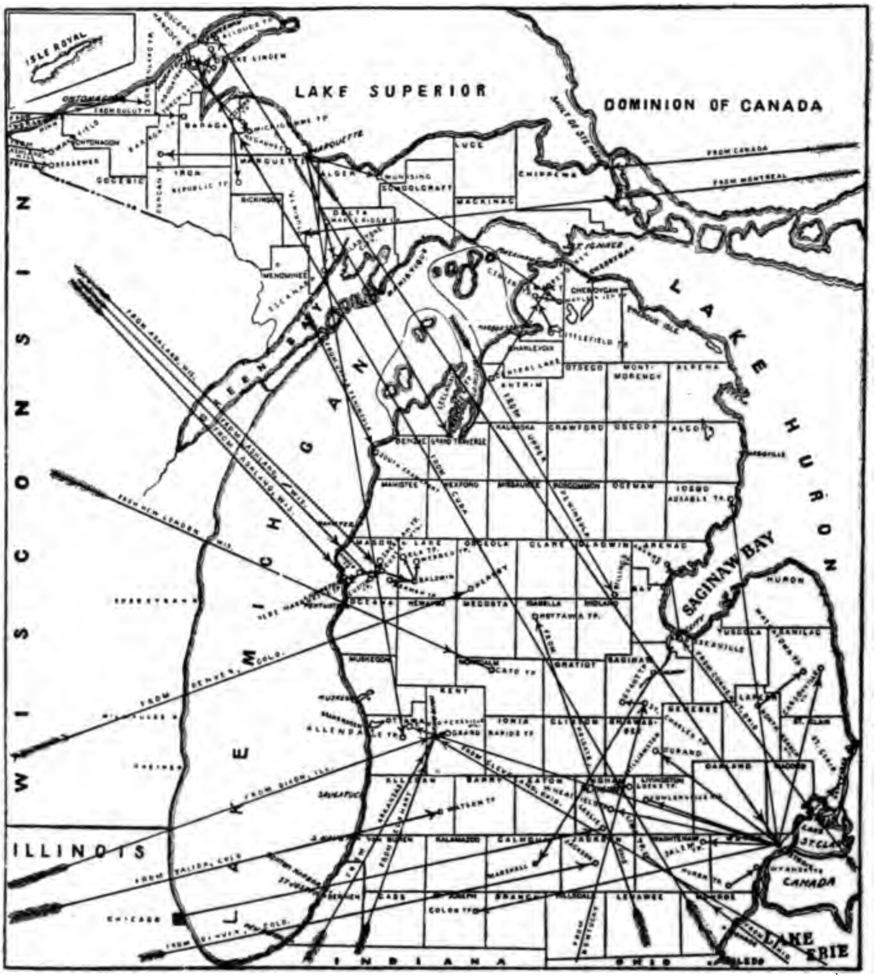
*** This foot-note is printed at the bottom of the first page of this table.**

Movement of contagium of smallpox in 1900.—Plate No. 1112 graphically shows movements of contagium of smallpox into, and around the State of Michigan.

One of the very important facts graphically shown by this map is the difference in the success of public health work in different cities. In Marquette, the disease was not traced to any outside source; and it was spread from Marquette to five other places. In Detroit, the disease was traced to only one outside source (Marquette), yet it was spread from Detroit to eight other places in Michigan. To just how many places in Canada it is not known, but it was reported to have been widely spread in Canada from Detroit, where it was alleged to have been called chickenpox by Health Officer Gibbes.

The health work in Grand Rapids in that year is something of which to be proud. Smallpox was brought to Grand Rapids from four different States, yet so far as known it was not permitted to spread from there to any other place whatever.

MOVEMENTS OF CONTAGIUM OF SMALLPOX IN 1900.



THIS MAP ILLUSTRATES TABLE II. LINES CONNECT THE LOCALITIES INFECTED. THE ARROWHEADS INDICATE THE DIRECTIONS OF THE MOVEMENTS.

[PLATE 1112]

ECTHYMA (?) IN MICHIGAN IN 1900.

This outbreak is not included in the article relating to smallpox.

November 27, 1900, Arthur E. West, M. D., health officer of Eaton Rapids city, wrote to the secretary of this Board as follows, relative to an outbreak of ecthyma in his jurisdiction:—

"There has broken out in the public schools here a skin disease which is contagious and which I believe to be ecthyma. Now while it is not particularly dangerous as far as life is concerned, it is a loathsome disease. Do you think the board would be justified in keeping the infected children from school?"

November 28, 1900, in reply to Dr. West's letter the secretary wrote:—

"Accept thanks for your letter of November 27 relative to ecthyma. Are you sure that you have not smallpox to deal with? I note by your report that you have seven cases. How long has it been since these cases were vaccinated? In each of the seven cases? Why should there be seven cases of ecthyma?

"During my recent personal investigation of the smallpox situation in the Upper Peninsula, I found many instances of mistaken diagnosis. The mild forms in all degrees are indeed very common, and a greater number of localities are reported to be infected with it this year than have been reported in a number of years, as you may note by the weekly bulletin issued by this Board (copy herewith).

"Relative to just what action you should take in regard to the subject, I think you should promptly investigate and report the facts to this office in detail; names and ages of those sick, when vaccinated, and the exact course the eruption takes, is it papular, then vesicular, then pustular? How long is each stage?

"An investigation as to possible exposures and as to the communication among the cases might throw some light on the subject."

Replying to the secretary's letter, December 7, 1900, Dr. West again wrote to the secretary:—

"Please find enclosed my report of the contagious skin disease in our city. The report to me of new cases and consequent investigation of the same have delayed this report. Although none of the children having the disease have been vaccinated and at least two have presented constitutional symptoms, in my own mind I don't believe it smallpox.

"There did occur a case last winter, however, which I only heard of last night, that might have been such. A boy about thirteen years of age came down with headache and backache, nausea and vertigo. In two or three days he broke out all over and his mother said it looked like chicken-pox, but as he had had that disease it was diagnosed as la grippe. He recovered in about three or four weeks. No other cases occurred in the family though none of the children were vaccinated. Would we be justified in ordering all infected children out of school?"

Following is the report mentioned by Dr. West in the last quoted letter.

REPORT CONCERNING CONTAGIOUS SKIN DISEASE CALLED ECTHYMA.

Family I. Case 1, Keith Crall. Age, seven months. Nationality, American. Male sex. Not vaccinated.

History: Two months ago was scratched on back of head with a pin. The wound did not heal readily and in about one week the mother noticed little pimples coming up around the scratch. These grew larger and became little blisters. The blisters finally became filled with pus and then were ruptured or dried into a scab. These grew some larger and were surrounded with a reddened and rather infiltrated area. Around the old lesions new ones made their appearance and at present the diseased area covers a place the size of a small hand. No history of constitutional disturbance.

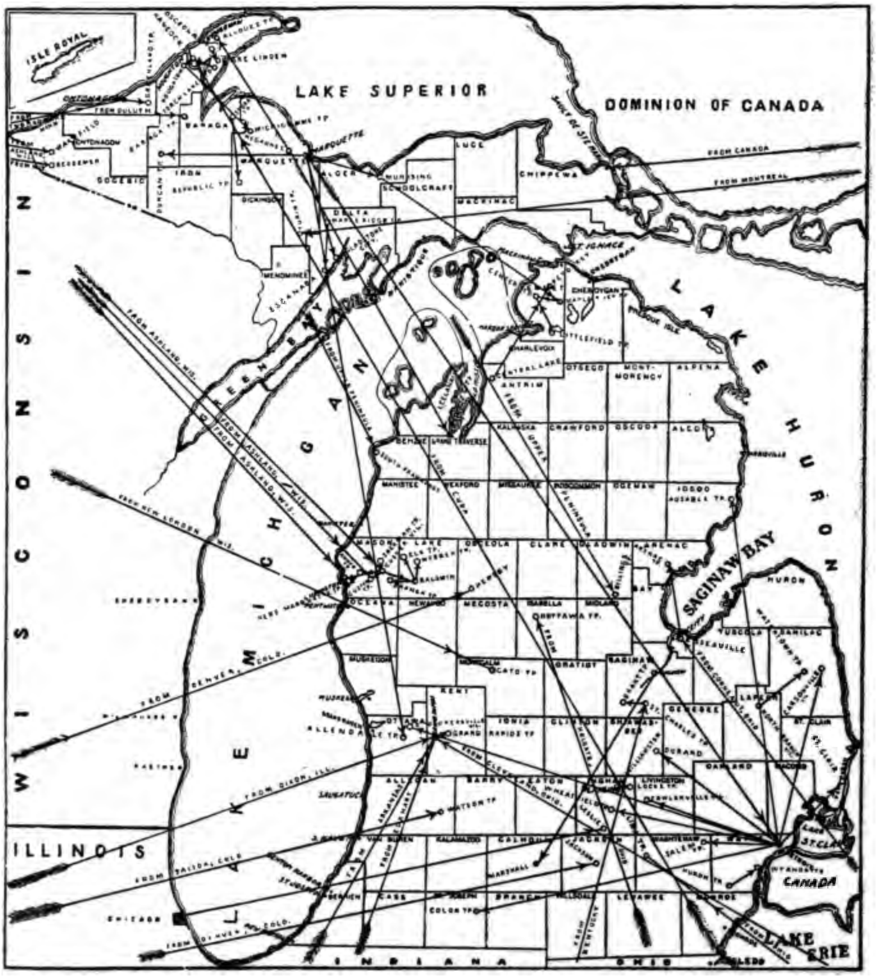
Case 2. Mildred Crall. Age, thirteen years. Nationality, American. Female sex. Never vaccinated.

History: About six weeks ago hurt her knee resulting in an abrasion of the skin. In about five days she noticed small pimples on and about the abraded area which rapidly (in twenty-four hours) became vesicular, then pustular. The pustules ruptured or dried into scabs and finally, under application of goose grease, healed. Been healed, she said, about one week. None appeared on the rest of the body. No fever or headache, or other symptoms of constitutional disturbance.

Case 3. Leo Crall. Age, eight years. Nationality, American. Male sex. Not vaccinated.

History: About two or three weeks ago there appeared on his chin a small pimple like an ordinary acne lesion. In a few days this assumed the characteristics of a blister, then becoming pustular and finally rupturing and scabbing over. It spread as in case 1, until it covers an area the size of a copper cent. He has had no constitutional disturbance.

MOVEMENTS OF CONTAGIUM OF SMALLPOX IN 1900.



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"There did occur a case last winter, however, which I only heard of last night, that might have been such. A boy about thirteen years of age came down with headache and backache, nausea and vertigo. In two or three days he broke out all over and his mother said it looked like chicken-pox, but as he had had that disease it was diagnosed as la grippe. He recovered in about three or four weeks. No other cases occurred in the family though none of the children were vaccinated. Would we be justified in ordering all infected children out of school?"

Following is the report mentioned by Dr. West in the last quoted letter.

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History: Two months ago was scratched on back of head with a pin. The wound did not heal readily and in about one week the mother noticed little pimples coming up around the scratch. These grew larger and became little blisters. The blisters finally became filled with pus and then were ruptured or dried into a scab. These grew some larger and were surrounded with a reddened and rather infiltrated area. Around the old lesions new ones made their appearance and at present the diseased area covers a place the size of a small hand. No history of constitutional disturbance.

Case 2, Mildred Crall. Age, thirteen years. Nationality, American. Female sex. Never vaccinated.

History: About six weeks ago hurt her knee resulting in an abrasion of the skin. In about five days she noticed small pimples on and about the abraded area which rapidly (in twenty-four hours) became vesicular, then pustular. The pustules ruptured or dried into scabs and finally, under application of goose grease, healed. Been healed, she said, about one week. None appeared on the rest of the body. No fever or headache, or other symptoms of constitutional disturbance.

Case 3, Leo Crall. Age, eight years. Nationality, American. Male sex. Not vaccinated.

History: About two or three weeks ago there appeared on his chin a small pimple like an ordinary acne lesion. In a few days this assumed the characteristics of a blister, then becoming pustular and finally rupturing and scabbing over. It spread as in case 1, until it covers an area the size of a copper cent. He has had no constitutional disturbance.

Case 4. Norma Crall. Age, three years. Nationality, American. Male sex. Never vaccinated.

History: About one week ago mother noticed a pimple but gave it no attention. However, in about three or four days she noticed that the pimple had become a sore about the size of a pea. The sore is covered with a dark scab and is surrounded with a reddened and infiltrated area. Since then they have increased in number to three. There has been no constitutional disturbance.

Family II. Case 1, Winfred Jessop. Age, eleven years. Nationality, American. Male sex. Never vaccinated.

History: About four and one-half months ago he was bit by a snake above the ankle. This healed quite readily, but about the first of September he began to complain of itching around the ankle and said his shoes hurt him. His mother investigated, and found several sores about the size of a pea to a ten cent piece. The sores were purplish in color, deep pitted, and mostly covered with a dark brown scab and surrounded with a reddened and indurated area. The mother said the sores came at first as a pimple which in a few days looked like a blister. When the top was taken from the blister, there was beneath a deep pit in flesh. The sore then scabbed over looking as above described. One or two sores appeared on his hands but on no other part of his body. He had no constitutional disturbance of any kind. (It may be of interest to note that an old man who lives in the house and who had varioloid years ago, has said from the first that the boy had smallpox.) The case was diagnosed by a local physician as ring-worm. It was treated with some sort of ointment and the last sore healed about three days ago. In this case the disease run a course of about three months.

Family III. Case 1. David Goodrich. Age, one and one-half years. Nationality, American. Male sex. Never vaccinated.

History: About one and one-half months ago mother saw a small sore on face. This presented the same characteristics above mentioned. The sore spread and new ones appeared until there were several. Under the treatment of a physician the case has recovered within the last week. There was no constitutional disturbance. (I discovered since that the first lesion came from a cut on the finger instead of the face and then spread to the face.)

Case 2. Mrs. Goodrich. Age, thirty-six years. Nationality, American. Female sex.

History: About ten days after it appeared on the child's face she had one of the sores come on the thumb. Under treatment it disappeared without spreading.

Case 3, Olive Goodrich. Age, eight years. Nationality, American. Female sex. Never vaccinated.

History: About one month ago cut her finger. In a few days the sore appeared in and about the cut. These lasted about one month and disappeared under treatment. The lesions presented the same appearance of lesion described in the cases above. She had no constitutional symptoms.

Case 4. Gladys Goodrich. Age, four years. Nationality, American. Female sex. Never vaccinated.

History: The lesions appeared first on the face (chin), presenting all the characteristics above described. Under treatment they disappeared, in about two weeks. The child has felt perfectly well all the time.

Family IV. Case 1, Burns Collins. Age, eight years. Nationality, American. Male sex. Never vaccinated.

History: About one and one-half months ago received a scratch on the face. This refused to heal and in about two weeks, after slight constitutional disturbance (fever, headache, and backache), pimples appeared in and about the scratch. These followed the same course above described, there still being lesions on his face and hands.

Case 2. Matie Collins. Age, eleven years. Nationality, American. Female sex. Never vaccinated.

History: About one month ago was taken with headache and backache, nausea and vomiting accompanied with vertigo. In two or three days several pimples appeared in the face following the course above described. They are all healed now leaving red areas where the sores were. The sores came around the mouth first. There are no pits. This case run a course of about three and one-half weeks. Her mother says the child is always sickly and always breaks out when sick.

The mother of both these children is subject to hysteria and the father is a hard drinker. The children are all poorly nourished and of neurotic temperament.

Family V. Case 1, Walter Gates. Age, seven years. Nationality, American. Male sex. Never vaccinated.

History: Four or five weeks ago got burned on the arm. This did not heal readily and in about two or three weeks sores were noticed about the burn, which was discharging. In a few days the father noticed a blister on the chin. This dried down into a scab. This has spread at the periphery until it is about three or four times its former size. No constitutional symptoms.

Family VI. Case 1. Floyd Miller. Age, thirteen years. Nationality, American. Male sex. Never vaccinated.

History: About five weeks ago he blistered his heel and a few days after a sore appeared. About two weeks after this he hurt the front of his leg, producing an abrasion. In about a week pimples began to appear about the abrasion. They soon became pustular and finally dried down and scabbed. At present there is but one scab and about four or five sores started. The abrasion has become an ulcer about the size of a copper cent and refuses to heal. He has not been sick at all.

Family VII. Case 1, Floyd Wallace. Age, about ten years. Nationality, American. Male sex. Never vaccinated.

History: About six weeks ago came to me with a running sore on his hand. There were red lines and a red rash, very fine, running to the axilla. The axillary glands were swollen and painful. He felt ill but had no fever or pains anywhere. Hot fomentations and a fifty per cent ichthyol ointment relieved everything but the sore on the hand, which is indurated and still discharges some. This does not present the characteristics of the other sores; however, about two weeks ago he had a boil under his chin which after rupture did not heal and now presents an appearance identical with the lesions of the other children.

Case 2, Veda Wallace. Age, eight and one-half years. Nationality, American. Female sex. Never vaccinated.

History: **About one week ago she noticed a pimple on her chin and scratched the top off. It grew larger from that time on, scabbing over in about two days. It presents the characteristics above described but at present seems to be healing. Yesterday, December 9th, she felt ill and had a very fine reddish rash which disappeared before night. The rash was all over her but worse on outside of thighs and back. No rash on face.**

Family VIII. Case 1, Ethel Zentmyers. Age, six years. Nationality, American. Female sex. Never vaccinated.

History: **Two weeks ago the father noticed a pimple on nose which he called a "cat-boil." In a few days he noticed that in its place was a scab the size of a pea. Gradually other lesions appeared on the face and then the hands. Some of the lesions are still present, having identically the same appearance as the lesions described in the earlier part of this report. She has not been ill at all. The sores are healing under treatment for ring-worm.**

Remarks: **There are three other cases, but I have been unable to see their parents and will not delay mailing this report longer. If necessary I will send them after I hear from your office.**

The cases, with the exception of the Goodrich family, have occurred in poor families and in poorly nourished children.

Nearly all the cases started in wounds.

I have heard that there was a similar condition in Ann Arbor and Charlotte.

I have made the diagnosis of ecthyma because the disease more closely resembles the classical description of ecthyma than any other.

Very respectfully,
ARTHUR E. WEST,
Health Officer of Eaton Rapids city, Mich.

Dated at Eaton Rapids, Dec. 7, 1900.

CHICKEN-POX (VARICELLA) IN MICHIGAN IN 1900.

During the year ending December 31, 1900, the presence of chicken-pox at fifty localities in Michigan, was reported to the State Board of Health. Two hundred and eighty-six cases were reported to have occurred in these fifty localities.

The article relating to this subject is not printed because the size of this report is limited by law to 300 pages.

COWPOX IN MICHIGAN IN 1900.

During the year ending December 31, 1900, cowpox, or suspected cowpox, was reported present in four local jurisdictions in Michigan, as follows: Summerfield township, Monroe county; Fowler village, Bengal and Bingham townships, Clinton county.

The article relating to this subject cannot be printed here because the law limits the size of this report.

ANTHRAX IN MICHIGAN IN 1900.

During the year ending December 31, 1900, three outbreaks of alleged anthrax were reported to this office, one having occurred near Lake City, Missaukee county; one in Reeder township, Missaukee county, and one near Grand Rapids, Kent county.

The article relating to this subject is crowded out.

ALLEGED RABIES (HYDROPHOBIA) IN MICHIGAN IN 1900.

During the year 1900, information relative to four alleged outbreaks of rabies, in four localities in Michigan, was received at the office of the State Board of Health. The jurisdictions in which these outbreaks were reported to have occurred were: Buchanan village, Berrien county, 2; Fargo, Greenwood township, St. Clair county, 1; Ypsilanti city, Washtenaw county, 1; Austin township, Sanilac county, 1.

The following extracts from correspondence of this office give details relative to the above-mentioned outbreaks:—

Alleged rabies in Buchanan village.—During the months of February and March, 1900, six letters were received at this office from J. Asa Garland, M. D., health officer of Buchanan village, relative to the two outbreaks of rabies reported to have occurred in that place.

February 8, Health Officer Garland wrote:—

"I write for information concerning some cases of rabies which have developed among dogs in my jurisdiction. Kindly inform me as to the best steps to take."

February 10, 1900, the secretary of this Board wrote to Dr. Garland as follows:—

"Rabies is a very dangerous communicable disease and prompt measures for its restriction should be taken. If the dogs referred to have contracted rabies they will surely die; and if any person has been bitten they should be isolated, and *not* killed, so that the diagnosis of the disease may be certain. The disease is spread to man by inoculation, as for instance by dog bites. Act 125, laws of 1889, requires the health officer or the local board of health to report the existence of rabies to the State Live Stock Commission; but in this instance I have written the contents of your letter to Hon. C. A. Tyler, Member State Live Stock Commission, Nottawa, Michigan. That commission has to do with the diseases in animals only. I presume you will hear from Mr. Tyler right away upon the subject."

February 26, 1900, the following letter was received from Health Officer Garland:—

"Relative to our rabies, I can say that we have two dogs that presented all the premonitory signs and symptoms of the disease, and both were bitten by a dog which was supposed to be rabietic but was killed before anything could be done. I have had one dog in a room adjoining my office for thirty-six hours and had him killed this A. M. Concerning the second dog, it died as the result of the disease early this A. M., about seven days after the first signs were noticed." "I can say we have several dogs that have shown marks of rabies. But only one of these was allowed to run its course, it, however, dying on the sixth day, after the first symptoms, and between four and five weeks from the day it was bitten. On post mortem examination pathological changes concurrent with rabies were found. We now have twelve dogs in quarantine by order of C. A. Tyler."

March 7, 1900, Health Officer Garland again wrote:—

"I am pleased to inform you that we are having it agreeably quiet in the canine family in our vicinity. Both Mr. Brown and Mr. Tyler have visited our village to investigate the condition and ordered strict quarantine."

December 28, 1900, Secretary Baker wrote to Health Officer Garland as follows:—

"Your postal card report of sickness for the week ending December 22, 1900, with note on the margin of the card which reads 'Rabies 1 case; killed dog as soon as discovered,' is before me, for which please accept thanks.

"Relative to the killing of the dog,—it is exceedingly important that a dog, ***having bitten a person***, should not be killed until after a lapse of period sufficient to determine whether or not the dog has rabies. If he has rabies he will surely die, in which case the person bitten will have a warning which he will do well to heed ***at once***. If the dog is found to have rabies and the person acts promptly, he may take such treatment at the Pasteur Institute in New York or Chicago, and possibly at the State Laboratory of Hygiene at Ann Arbor, as to greatly improve his or her chance for life; on the other hand, ***if the dog does not die within three weeks the person may be absolutely certain that he or she is not in danger of rabies from that bite,*** and may be free from fear which otherwise might be serious.

"However, my inference is that the dog alleged to have rabies, did not bite any one; but I write this information to you for future use, as rabies is a very dangerous communicable disease."

December 27, 1900, Dr. Garland wrote to this office as follows:—

"As you have observed by my reports there has wandered into our village a 'mad dog.' It was reported to me and I had the dog shot. Immediately several other dogs came in contact with this fellow while on the street. What can I do?"

In answer to Health Officer Garland's letter, the Secretary wrote:—

"My letter of yesterday, which is enclosed herewith, is about the advice this office would give relative to the subject; with the possible exception that if you are absolutely sure that the dog which came in contact with the dog who had rabies if not valuable should be killed: they should at least be isolated until after the expiration of the average period of incubation—say fifty days."

May 7, 1900, Secretary Baker wrote the following letter to Prof. C. E. Marshall of the Agricultural College:—

"Information reached this office that some of the material from dogs believed to have had rabies had been sent to you for examination. If the report is true, will you have the kindness to send to this office a report of the facts, and the results of your examination?"

Prof. C. E. Marshall had written to Hon. C. A. Tyler, member of the State Live Stock Sanitary Commission, Nottawa, St. Joseph county, relative to his examination of the said material, and in reply to Dr. Baker's letter sent the following copy of his letter to Mr. Tyler:—

"I am now able to report the existence of rabies in the dog used in the first examination. Two rabbits died today from inoculation. These two rabbits were inoculated at the same time and have died within a few hours of each other."

Alleged rabies in Fargo, Greenwood township, St. Clair County.—May 23, 1900, Chas. Turnow, of Fargo, Greenwood township, St. Clair county, wrote to the President of the State Live Stock Commission relative to an outbreak of rabies in his jurisdiction, as follows:—

"We have a case of what the veterinary surgeon claims is hydrophobia. One calf has died and one yearling and one horse, the rest of the stock seems all right so far, and we have quarantined the rest of the stock. I wish you to tell me what we are obliged to do."

May 26, 1900, the Secretary of this Board wrote to Chas. Turnow in reply to the letter he wrote to Hon. J. H. Brown, as follows:—

"The commission has to do with the subject of diseases in animals only. I presume you will hear from Mr. Brown relative to the subject.

"Rabies (hydrophobia) is a dangerous communicable disease, and every precaution should be taken for its restriction. I am sending to you by this mail two publications of this office which will probably give some information relative to the subject of rabies."

Alleged rabies in Ypsilanti city, Washtenaw county.—August 25, 1900, J. Huestin, M. D., of Ypsilanti city, Washtenaw county, wrote the following letter to this office:—

"You will see I have had a case of rabies to care for. Dr. Vaughan saw the case with me and after death secured the cord and will make a full report. It was the usual terrible death. Mr. Tuttle lost a horse. The same day his dog bit him. His son-in-law skinned the horse not thinking of its being rabies. The horse had all the symptoms of the disease. I did not see the horse so may have another case. After this disease developed there was no time to take a Pasteur cure. We should have some place in this State for Pasteur treatment if that has proven anything. What can be done with the thousands of dogs unmuzzled, and many running with all the symptoms of rabies?"

August 27, 1900, Secretary Baker replied to Dr. F. Huestin's letter as follows:—

"I have notified Hon. J. H. Brown, President of the State Live Stock Commission, Battle Creek, Michigan, and suggested to him that the subject have immediate attention. Do you not think it would be advisable to recommend that the men who skinned the horse that died of rabies, visit a Pasteur Institute immediately?"

Alleged rabies in Austin township, Sanilac county.—October 6, 1900, Secretary Baker wrote John H. McRae, M. D., health officer of Austin township, as follows:—

"In the Freiburgh news, published in the Tri-County Chronicle, of Cass City, September 28, 1900, the following item appears: 'Five dogs have been killed as a consequence of hydrophobia, all of which showed symptoms of the malady.' Will you have the kindness to inform me whether the alleged facts as stated are true to your knowledge? If true, or if there are any grounds for the statement, kindly give a full statement of the outbreak of hydrophobia within your jurisdiction or elsewhere. Were any persons bitten? If so, how many, and what were the symptoms of each case? What measures were taken to preserve the public health?"

October 18, 1900, Dr. McRae replied to Secretary Baker's letter as follows:—

"There was an unknown dog came from Elmer township; it was supposed to have rabies; it was killed. The next was James Soul's dog, it went mad by being overheated on a hot day; it went away and was killed by the neighbors, but it bit three other dogs and they were killed as soon as it was bit but one, and he kept his about two weeks until he found it was mad and then he killed it. There was no damage done to the best of my knowledge."

NUISANCES IN MICHIGAN IN 1900.

During the year 1900, communications concerning eighty-nine alleged nuisances, in Michigan, were received at this office, which may be classified by causes as follows: Open ditches and drains, 14; sewer and cesspools, 11; slaughter houses and dumping grounds, 10; filthy condition of barns and stock pens, 9; privies, 7; contaminated water, 6; insufficiently buried animals, 5; manure pile and refuse, 3; dead animals thrown into river or lake, 2; packing house where pigs are fed from offal, 1; sawdust and slabs thrown into lake, 1; dam used for flooding logs, 1; open cellar, 1; draining of lake, 1; improper disposal of night-soil, 1; pulp from sugar beet factory, 1; emery dust in stove works, 1; burning sulphur rock, 1; steam whistle, 1; "unsanitary conditions," 12.

Advice was given in each instance. The article on this subject is omitted.

GLANDERS IN MICHIGAN IN 1900.

During the year ending December 31, 1900, there were reported to this office six outbreaks of alleged glanders in horses in Michigan in the course of which seven animals were reported infected, as follows: Clayton village, Lenawee county; Hillsdale township, Hillsdale county; Colonville village, Clare county; Marathon township, Montcalm county, and Columbiaville village, Lapeer county, were each reported as having had one case. In Lewistown township, Montmorency county, two horses were reported to have had the disease.

Advice to local officials was given in each instance, and the State Live Stock Commission was notified. The article on this subject is crowded out.

TUBERCULOSIS IN ANIMALS IN MICHIGAN, IN 1900.

Tuberculosis, or suspected tuberculosis, in animals, was reported present in seven localities in Michigan in 1900, as follows: Irving township, Barry county, 1 cow; Otisville village, Genesee county, 2 cows (suspected); Vicksburg village, Kalamazoo county, 1 cow; Cadillac city, Wexford county, 1 cow; Saginaw township, Saginaw county, 1 cow (suspected); New Fenville village, Allegan county, 2 cows (suspected) from which children and a cat were believed to have taken the disease; Tawas township, Iosco county (suspected), in cattle.

In each instance advice was given to local officials, and the State Live Stock Commission notified. The article is omitted.

INJURIES AND LOSS OF LIFE AND PROPERTY ALLEGED TO HAVE BEEN CAUSED BY THE USE OF KEROSENE, IN MICHIGAN, DURING THE YEAR ENDING DECEMBER 31, 1900.

Continuing a practice pursued in previous years, the office of the Secretary of the State Board of Health has, during the year 1900, sought to obtain information relative to each casualty, alleged to have been caused by the use of kerosene, which came to the notice of said office.

The principal sources from which this office obtains facts in regard to such casualties as above mentioned, are four, viz.: From reports by the fire marshal of Detroit, State inspectors and deputy inspectors of illuminating oils, local health officers, and from newspaper reports. Relative to the last of these sources of information it should be stated that the secretary of this Board does not accept as necessarily authentic, newspaper reports of casualties from the use of kerosene. When such reports come to his knowledge, he applies to the proper officials of the localities in which they are said to have occurred, for confirmation or contradiction of the reports, and for any information which these officials may be able to give in connection with the alleged casualties. A copy of the form of letter used on such occasions, is given in the annual report of this Board for the year 1892, page 334. The data collected from these sources show that during the year 1900, information was received at this office of the occurrence of 38 casualties consequent on the use of kerosene in Michigan. The casualties were reported to have occurred in 1 locality, causing loss of 0 lives and damage of property to the amount of $48,518.

TABLE 1.—*Casualties in Michigan during the year 1900, believed to have been consequent on the use of kerosene, information of which was received at the office of the Secretary of the State Board of Health. In this year the legal test was a flash test of 120° Fahr., in a Foster automatic tester.**

	Number of casualties.	Number of localities.	Pecuniary losses, dollars.	Lives lost.	Persons injured (not fatally).
In Detroit........................	38	1	48,518	0	0

This reported damage does not include all the actual pecuniary loss occasioned by the above mentioned casualties, because in some instances where houses, barns and other property were destroyed the loss was not reported.

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* In 1893, the legal test of kerosene, for illuminating purposes, was, by legislative enactment (Section 2, Act 94, Public Acts of 1893) made as follows: "It shall be the duty of the inspector and his deputies to provide themselves at their own expense with the necessary instruments and apparatus for testing the quality of said illuminating oils, and when called upon for that purpose to promptly inspect all oils hereinbefore mentioned, and to reject for illuminating purposes all oils which will emit a combustible vapor at a temperature of 120 degrees of Fahrenheit's thermometer: *Provided*, The quantity of oil used in the flash test shall not be less than half pint. The oil tester adopted shall be the Foster automatic tester cup, with the lighted wick placed inside the tube, and under the thimble which shall be used by the inspector and his deputies." Act 94 became operative July 1, 1893.

The decrease in deaths which occurred from the use of kerosene in 1900 as compared with 1899, and previous years is as follows: (1) From Detroit there were no deaths reported in 1900 which was a decrease of five in 1899.

Since the law changing the test went into operation in 1893, there were no deaths reported in the years 1893, 1895, 1896, 1898 and 1900. In 1894 there were 3 deaths, in 1897, 2 deaths and in 1899 there were 5 deaths reported in the city of Detroit.

In the State outside of Detroit, there were no kerosene casualties reported for the year 1900.

INJURIES AND LOSS OF LIFE AND PROPERTY ALLEGED TO HAVE BEEN CAUSED BY THE USE OF GASOLINE IN MICHIGAN IN 1900.

In 1900, as in former years, an effort was made, at the office of the Secretary of the State Board of Health, to collect facts respecting every casualty attributed to the use of gasoline, in Michigan, which came to notice. During the year there were received at the office of the Secretary of the Board reports of sixty-five casualties in two different parts of the State alleged to have been caused by gasoline, with attendant losses of life and property, and personal injury as follows: Two persons fatally injured; damage to property to the amount of $83,209.

TABLE 1.—*Casualties in Michigan during the year 1900, believed to have been consequent on the use of gasoline, information of which was received at the office of the Secretary of the State Board of Health.*

	Number of casualties.	Number of localities.	Pecuniary losses, dollars.	Lives lost.	Persons injured (not fatally).
In Detroit	64	1	83,109	1	0
In State (outside Detroit)	1	1	0	1	0
Totals in Michigan	65	2	83,109	2	0

Of the sixty-four reported casualties from the use of gasoline in Detroit during the year, one was attributed to stove explosion, forty-one were attributed to leaking or overflowing stoves, and twenty-two to carelessness in handling gasoline, and other causes.

The source of danger in the use of gasoline.—The special source of danger in the use of gasoline is its ready evaporation at low temperatures. When exposed to the air, gasoline evaporates quickly, its vapor mixes with the air, and therewith forms an explosive mixture which readily ignites when it comes in contact with a flame or other sufficient cause. This property of gasoline renders it more dangerous than is gunpowder. Some of the casualties reported were undoubtedly the result of ignorance, or disregard, of these facts.

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